



*Insights From the
Scott Learning
Center - Scott, MS
2022/2023*



**Jay S. Mahaffey
Science Fellow**



Thanks for the Invite!!!



You ask (hopefully) – “So tell me about the Scott Learning Center??”





Area: 322.38 ac
Perimeter: 21981.62 ft

SLC Profile

- In Scott since 2008
- 370 Total Acres
- Various soil types
- Corn, Cotton, Soybeans
- Chemistry
- Seed Applied Solutions
- “Commercially Simulated”

Tours at Scott – Talking and Listening



Technology Development
by MONSANTO

LEARNING CENTER
at Scott, Mississippi

SLC – Profile – 2022

- Soil type ranges from Sandy Loam to Clays
- Soil Ph from 6.61-7.79
- CEC ranges from:
 - 9.2 on Sands; 14 on Sandy Loam; 22 on Clay Loam; 34 on Clays
- Organic Matter ranges from 0.5-1.6%
- 50-55 inches rainfall /year
- Yield Expectations –
 - Irrigated – 240 Corn; 70 Soybeans; 1400 Cotton
 - 2022 – 240/70/1400+
 - Dryland – 110 Corn; 35 Soybean; 750 Cotton
 - 2020-2022 – Similar to Irrigated
 - And every gradation in between



The Difference Between Corn and Cotton

- CORN is a “deliberative” crop
- Make decisions upfront about:
 - Planting Rate
 - Yield Expectation
 - Equipment
 - Planting Date
 - Insect Management
- In season influence is limited compared to cotton



- COTTON is a “reactive” crop
- Make decisions upfront about:
 - Variety
 - Planting rate, fertility
- In season we have influence on:
 - PGR application
 - Insect control
 - Other agronomics
 - Crop termination
- Spend time taking advantage of the ability to compensate





Deltapine[®] Brand Cotton Products 2022



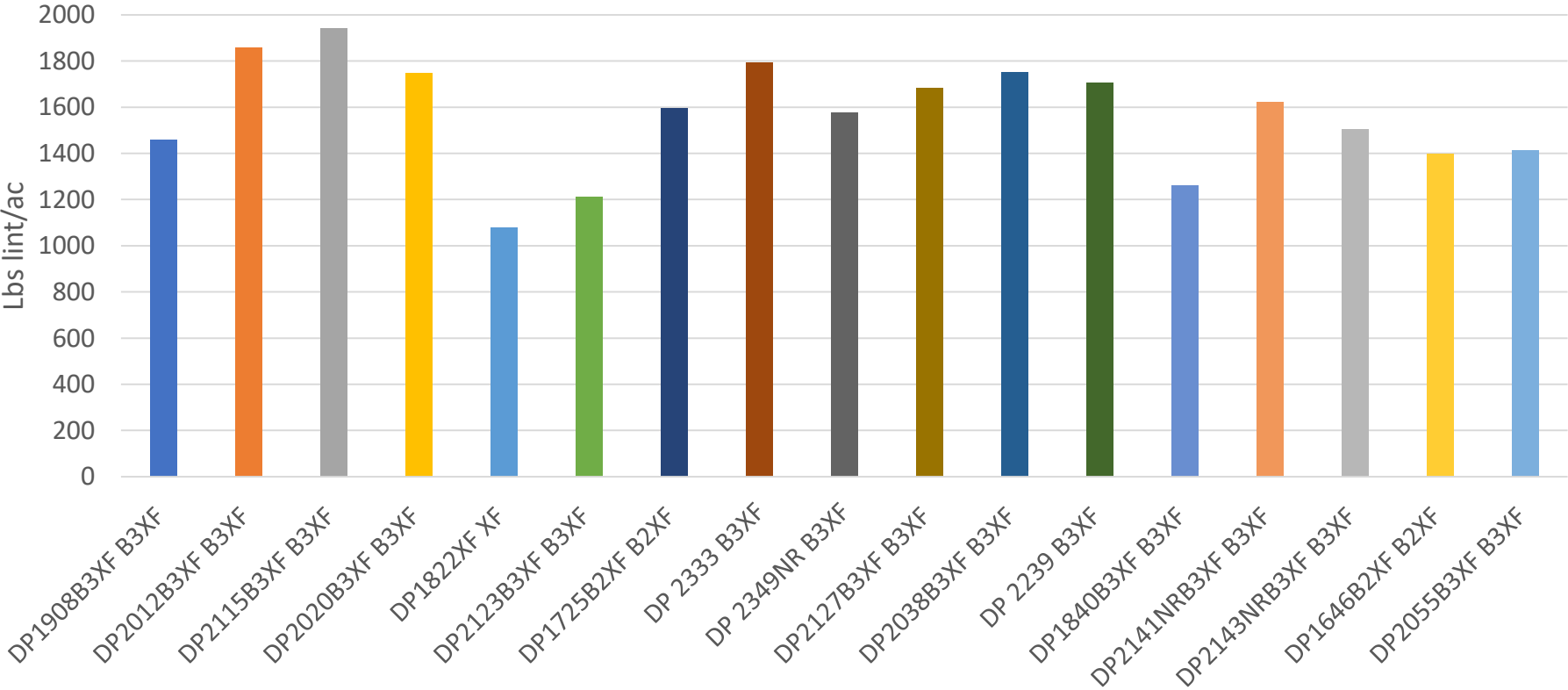
Scott Learning Center



Evaluation of Deltapine Cotton Varieties on Two Soil Types 2022 - SLC – Highway

Lint Yield

Highway-Lint/ac





Cotton Chronicles

Tales from the Bunker

Jay S. Mahaffey – Science Fellow
SLC-2020





1937

1957

1977

1997

2017



RESPONSE OF DELTAPINE® COTTON VARIETIES TO PLANT GROWTH REGULATOR REGIMES

BAYER LEARNING CENTER AT
SCOTT, MISSISSIPPI
2022





RESEARCH SITE DETAILS 2020 - EXAMPLE

- Application regimes of mepiquat chloride (standard 4.2% formulation) were as follows: (Table 1).
 - An untreated check with no PGR applied.
 - Passive regime (representing older growth management methods) – three application rates and three timings totaling 38 oz/acre applied with delayed early application on July 10, 2020 at a reduced rate.
 - Aggressive regime – three applications at a maximum label rates at three timings totaling 48 oz/acre applied.

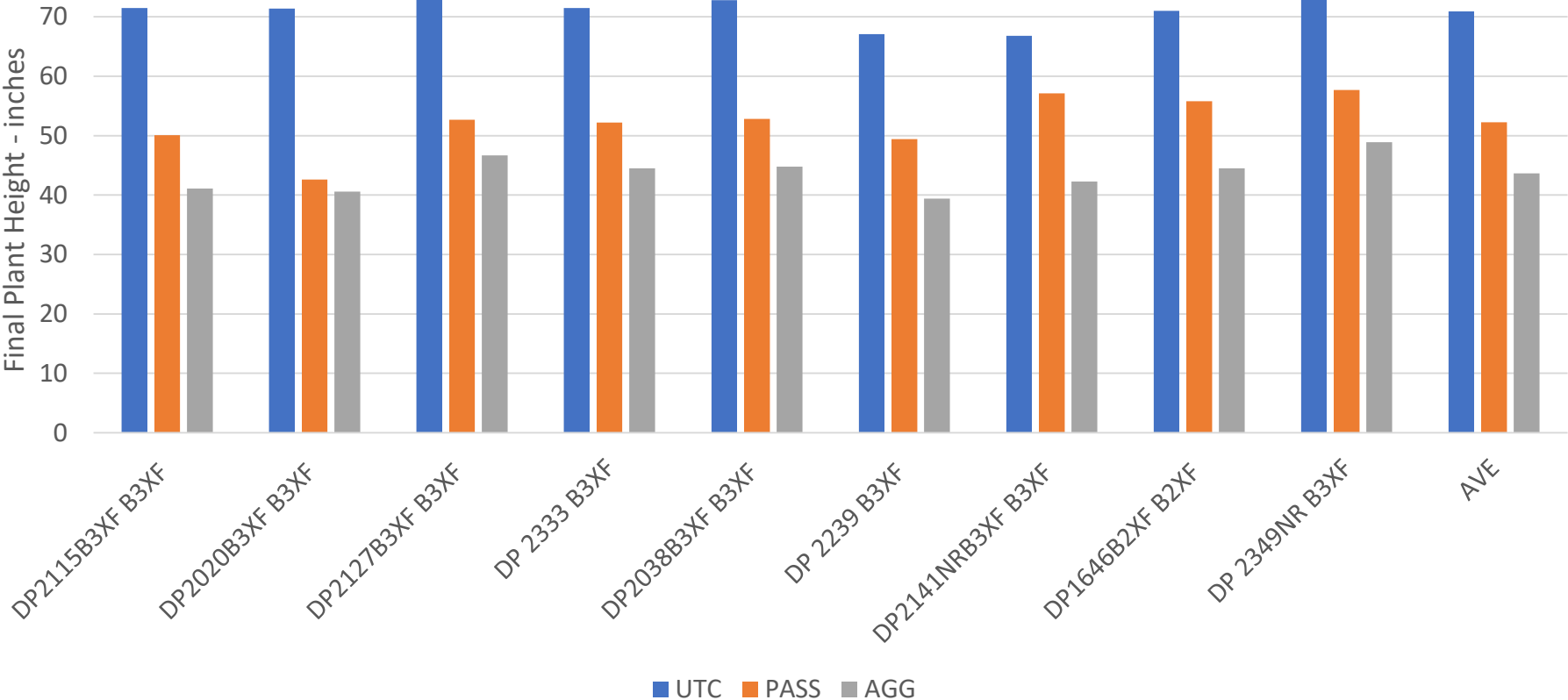
Regime	Date	PGR Rate (ounces/acre)
Passive	July 10	10
	July 26	12
	August 10	16
Aggressive	July 1	16
	July 10	16
	July 26	16

Table 1. 2020 passive and aggressive PGR treatment rates and application timings.

Cotton Variety x PGR Management

COTTON-03 – Field House Cut – 2022

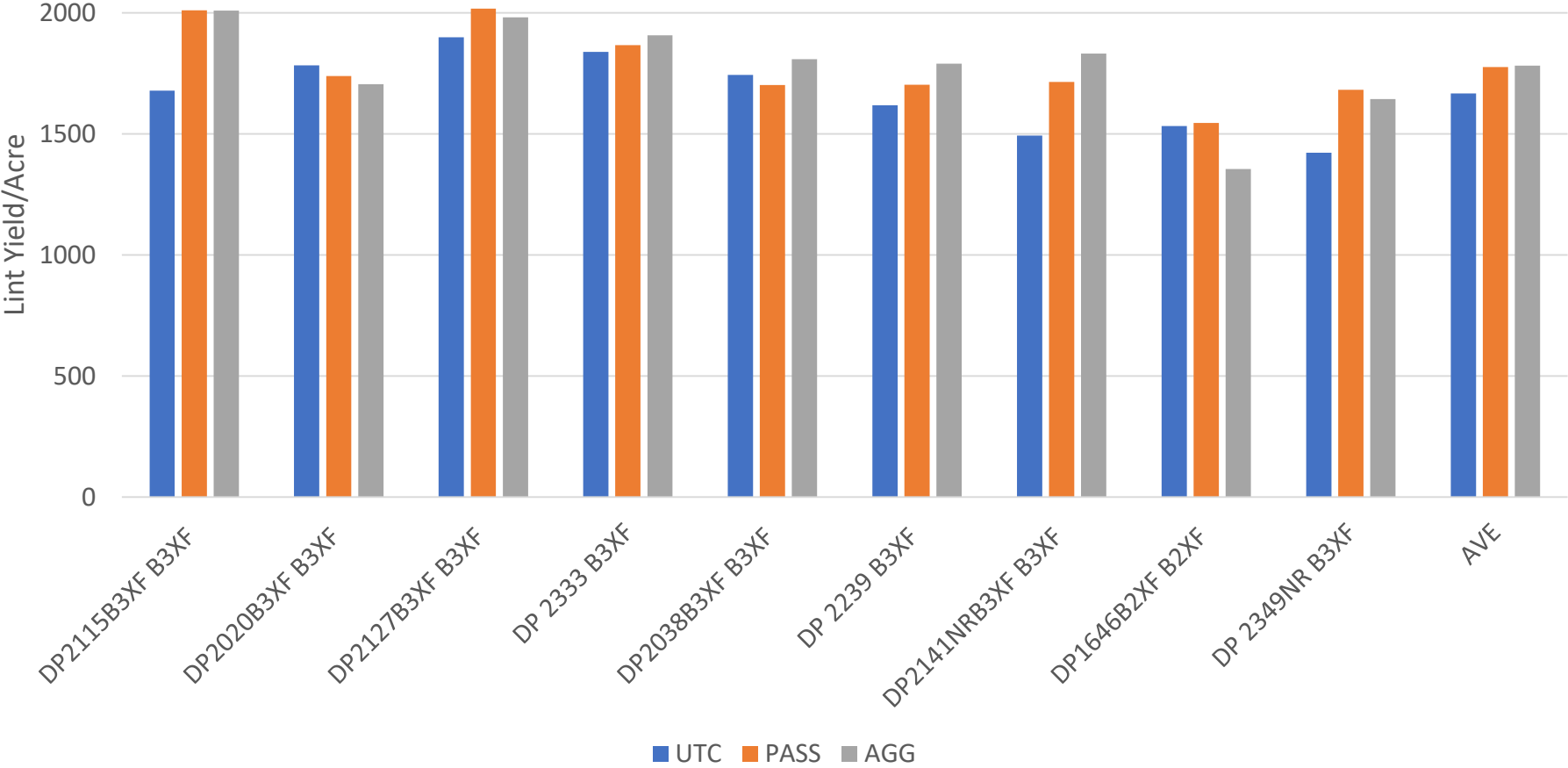
SLC – Final Plant Height - inches



Cotton Variety x PGR Management

COTTON-03 – Field House Cut – 2022

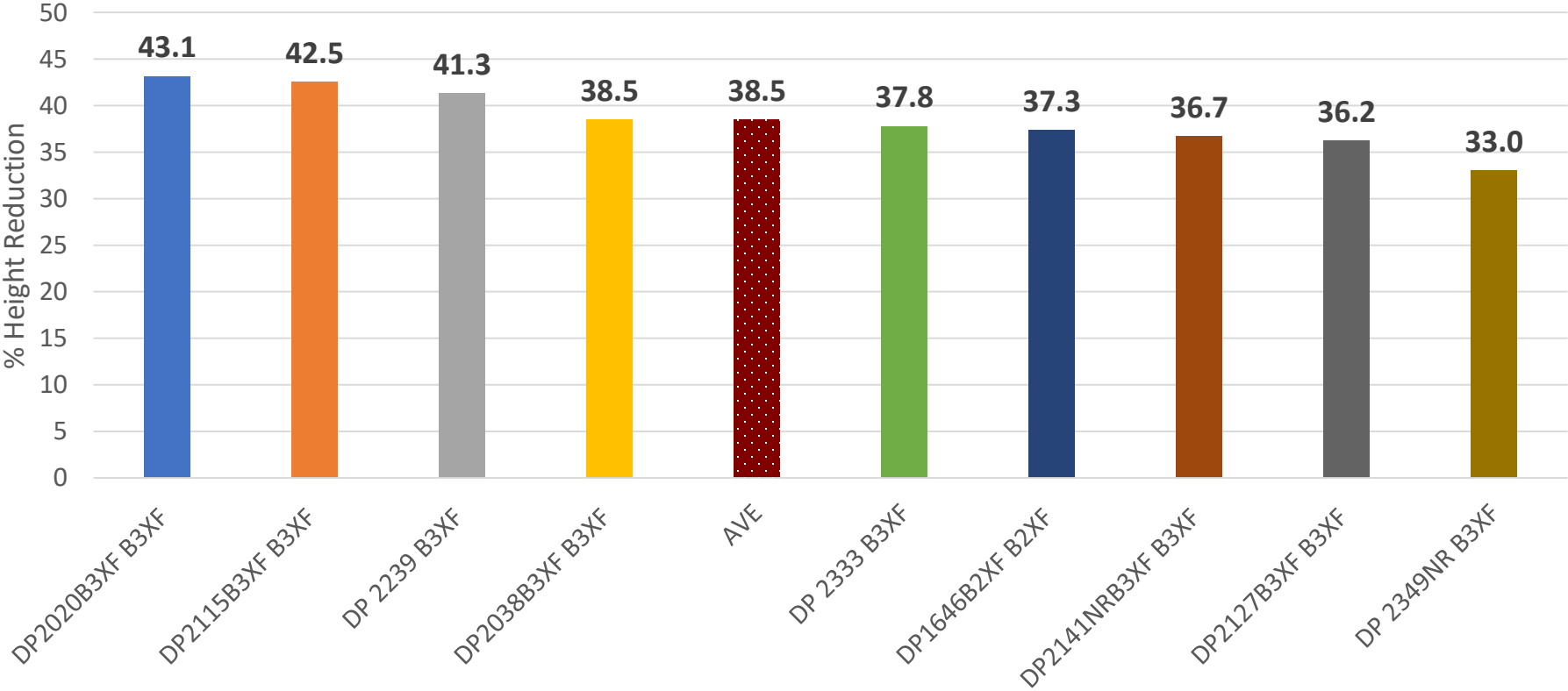
SLC – Lint yield/acre



Cotton Variety x PGR Management

COTTON-03 – Field House Cut – 2022

SLC – % Height Reduction – AGG vs UTC





A META-ANALYSIS OF COTTON RESPONSE TO PLANT GROWTH REGULATORS AT THE BAYER LEARNING CENTER AT SCOTT, MS FROM 2011 THROUGH 2021

BAYER LEARNING CENTER
SCOTT, MISSISSIPPI
2011 THROUGH 2021





RESEARCH SITE DETAILS

Location	Soil Type	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield (lbs/acre)	Seeding Rate (lbs/acre)
Scott, MS	Commerce/Forestdale silt loam	Corn	Conventional	May 1 or later	Vary	1900	41,000 to 45,000

- A total of 10 to 18 Deltapine® brand cotton products were tested each season.
- These studies were set up to encourage excessive vegetative growth due to strong background fertility levels, the previous corn crop, irrigation, and relatively high rates of nitrogen fertility (100 to 120 lb/acre of actual nitrogen soil applied as 32% liquid N).
- All agronomic inputs (weed control, insect control and irrigation) were per local standards for each treatment.
- There was no PGR trial in 2014 and no passive regime in the 2012 trial.

UNDERSTANDING THE RESULTS – PLANT HEIGHT

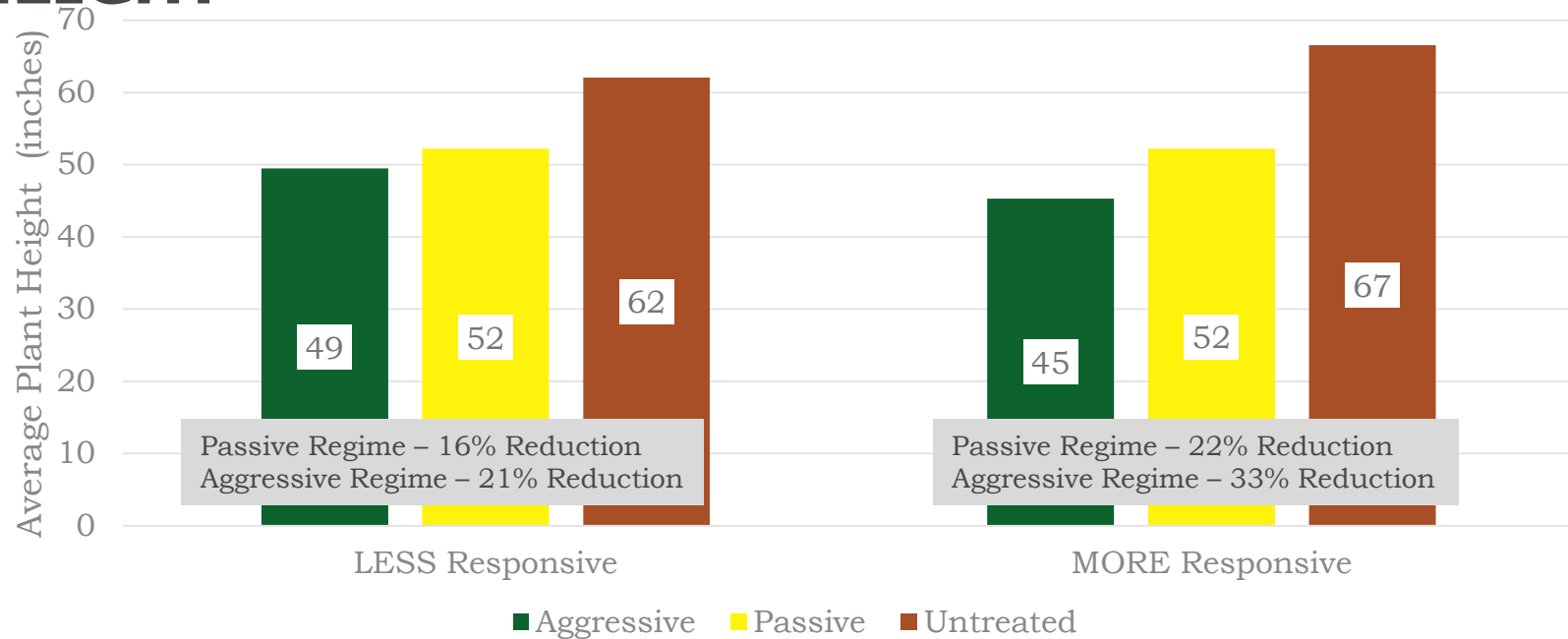


Figure 1A. Average cotton plant height by PGR regime from 2011 through 2021.

UNDERSTANDING THE RESULTS – AVERAGE YIELD

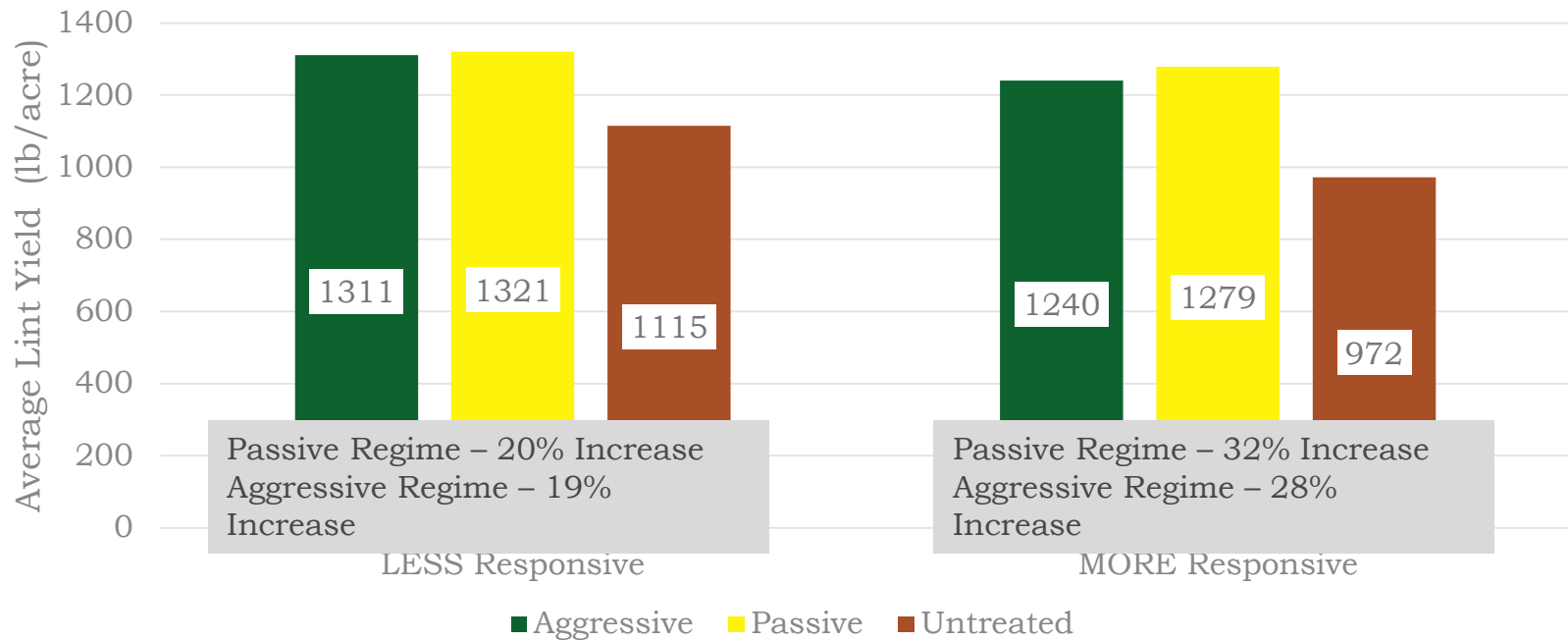


Figure 1B. Average cotton yield by PGR regime from 2011 through 2021.

UNDERSTANDING THE RESULTS – REGRESSION

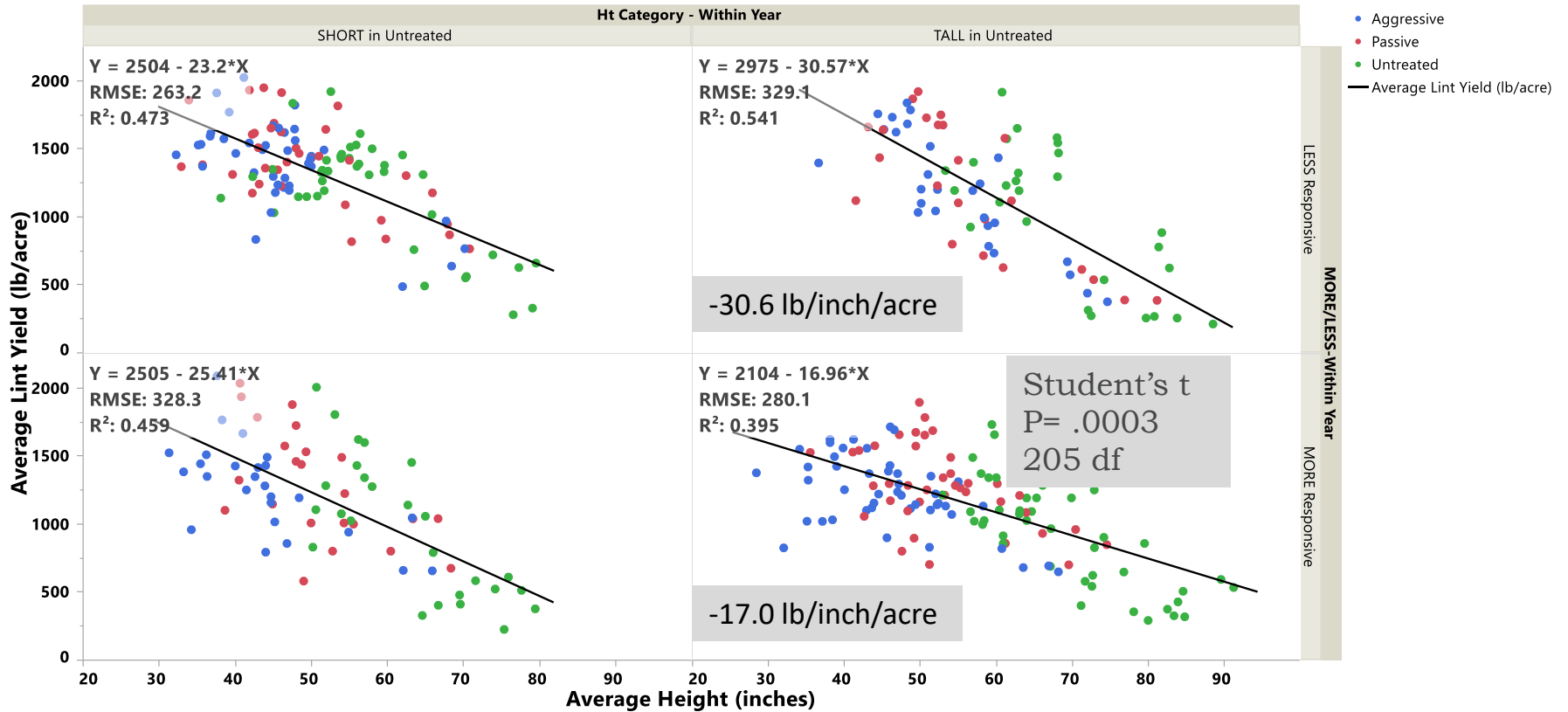


Figure 4B. Linear regression of average lint yield versus average height in Less Responsive and More Responsive Deltapine[®] cotton varieties from 2011 through 2021 at the Scott Learning Center. (Student t-test was significant at P=0.0003).



UNDERSTANDING THE RESULTS – REGRESSION

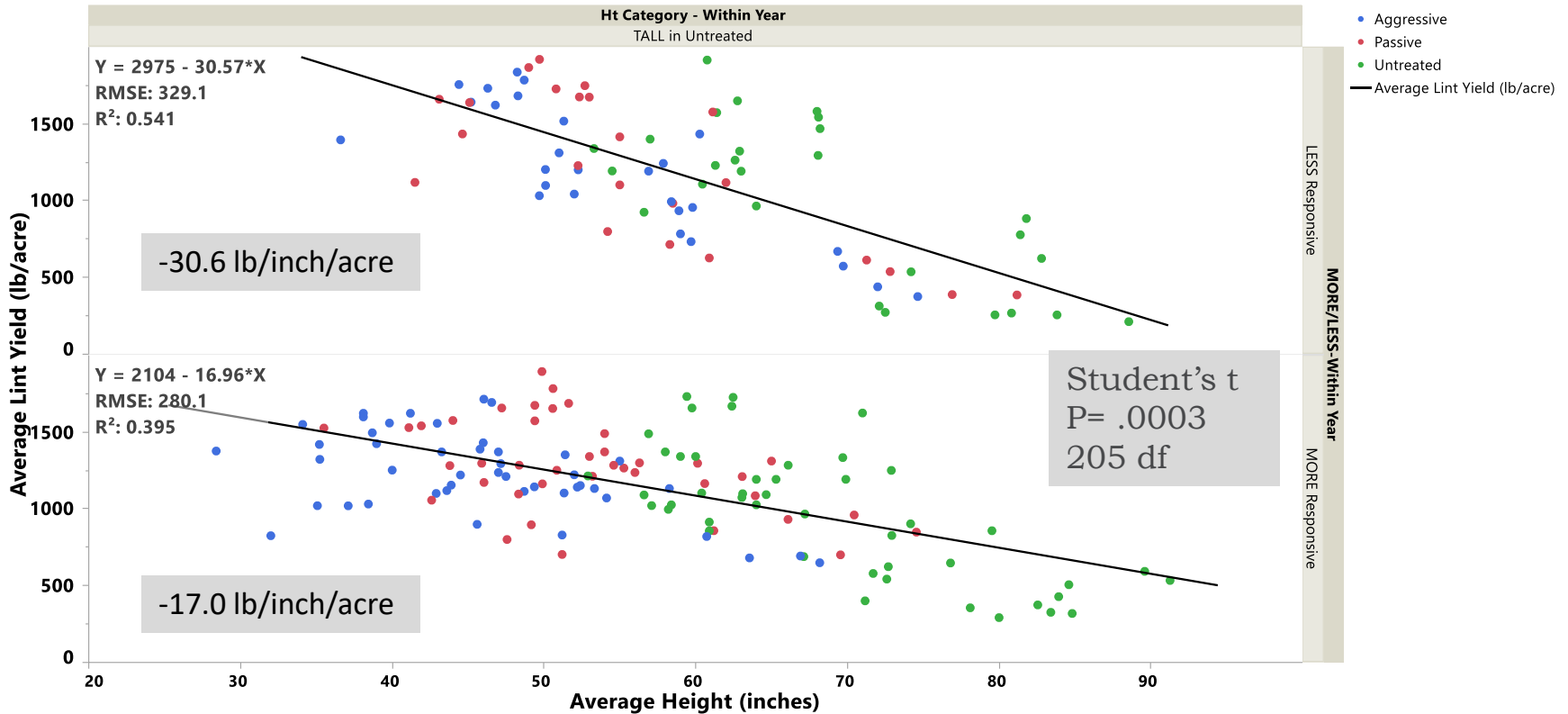


Figure 4A. Linear regression of average lint yield versus average height in Less Responsive and More Responsive Deltapine[®] cotton varieties from 2011 through 2021 at the Scott Learning Center. (Student t-test was significant at P=0.0003).



UNDERSTANDING THE RESULTS - REGRESSION

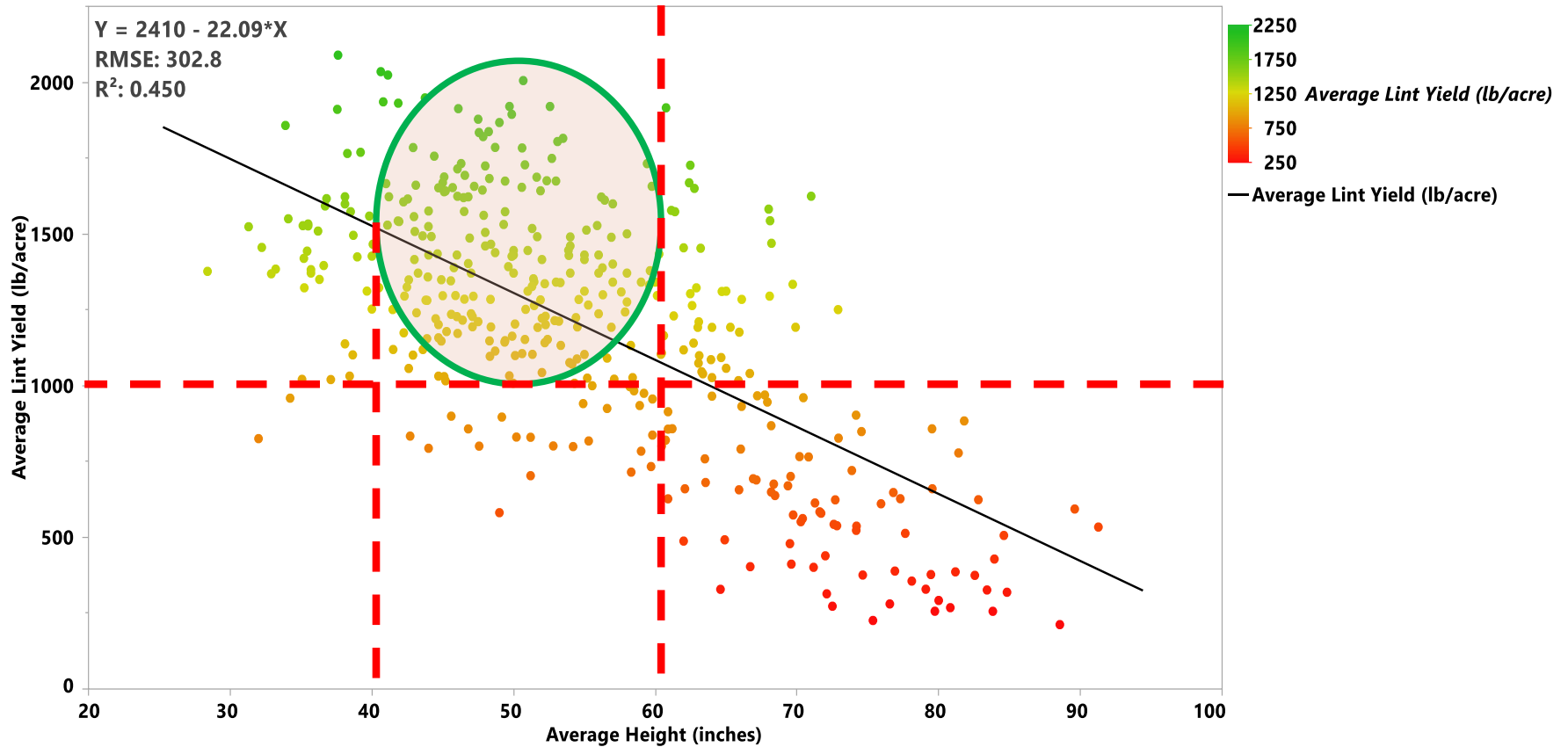


Figure 6. Linear regression of average lint yield versus average height of Deltapine[®] cotton varieties from 2011 through 2021 at the Scott Learning Center.



*Thryv*ON™

TECHNOLOGY

2021/22 Results





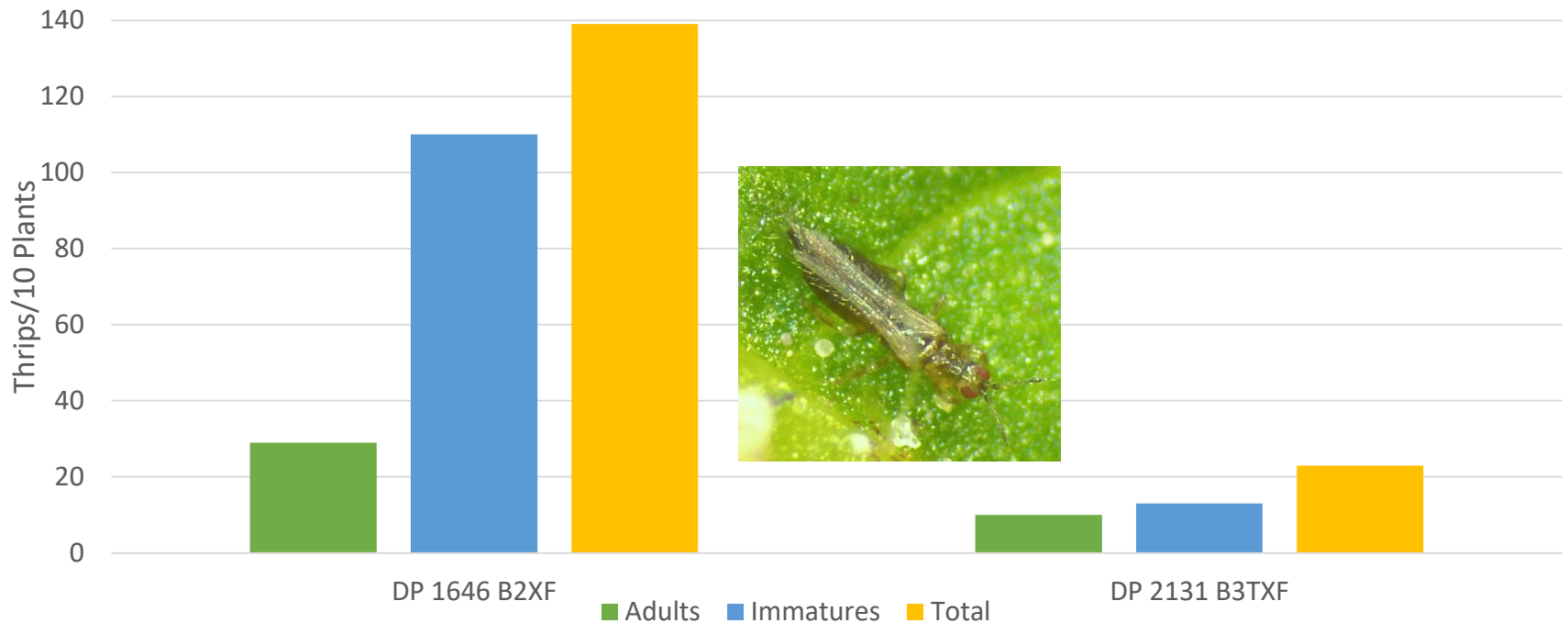
Thrips Sampling 2021



ThryvOn Thrips Efficacy Study – 2021

SLC – Field D4 – 6/7/2021 Jar Collections

PRELIMINARY – Thrips/10 Plants



DP 2131 B3TXF (containing ThryvOn) in the Center – DP 1646 B2XF at sides
SLC 2021 - Untreated for Thrips in Extreme Pressure



2021
ThryvOn™
Technology
Evaluations

Scott
Learning
Center

Scott, MS
Field D1

PRELIMINARY

Planting Date:
4/14/21-4/15/21
Date Photos Taken:
9/27/21



DP 2055 B3XF – Untreated Check – 0 Lygus Treatment



DP 2055 B3XF – 5 Lygus Treatments per Threshold



DP 2131 B3TXF – 3 Lygus Treatments per Threshold



DP 2131 B3TXF – Untreated Check – 0 Lygus Treatment

ThryvOn™ Technology has received full approval for planting in the United States but, as of the date this material was published, is pending approval in certain export markets. Specific plans for commercialization depend upon regulatory approvals and other factors.

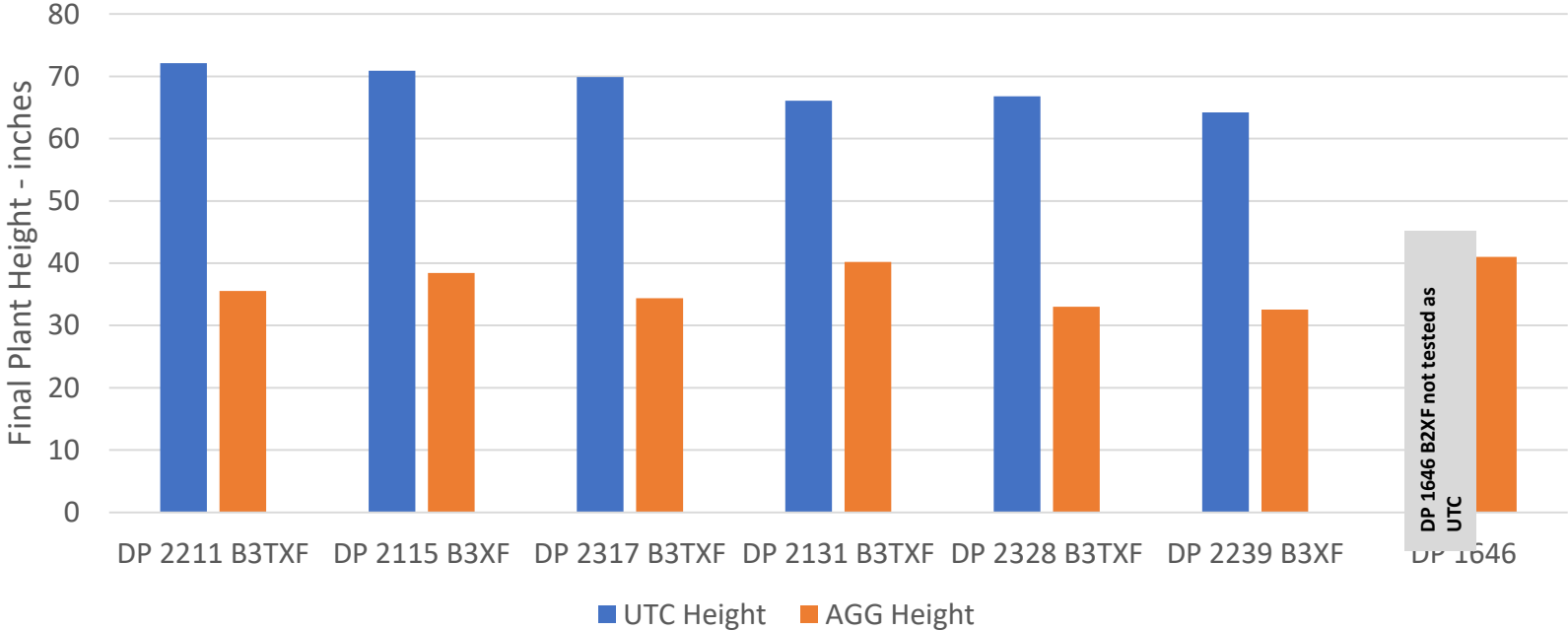
2022 ThryvOn Research – Scott Learning Center

Pass	DEMO	Trt #	Variety	Treatment
44	AGRONOMIC SYSTEM	1 - AGRO	DP 2131 B3TXF	Threshold Treated- High Input
42	24 Row Plots	2 - AGRO	DP 1646 B2XF	Threshold Treated- High Input
40	42000 Planted	3 - AGRO	DP 2211 B3TXF	Threshold Treated- High Input
38		4 - AGRO	DP 2127 B3XF	Threshold Treated- High Input
36		5 - AGRO	DP 2131 B3TXF	Threshold Treated- Low Input
34	42000 Planted	6 - AGRO	DP 1646 B2XF	Threshold Treated- Low Input
32		7 - AGRO	DP 2211 B3TXF	Threshold Treated- Low Input
30		8 - AGRO	DP 2127 B3XF	Threshold Treated- Low Input
28	ENTOMOLOGICAL SYSTEM	1 - ENTO	DP 2131 B3TXF	Threshold Treated- High Entomological Input
26	24 Row Plots	2 - ENTO	DP 2038 B3XF	Threshold Treated- High Entomological Input
24	42000 Planted	3 - ENTO	DP 2131 B3TXF	Threshold Treated- Low Entomological Input
22		4 - ENTO	DP 2038 B3XF	Threshold Treated- Low Entomological Input
20		5 - ENTO	DP 2131 B3TXF	Untreated
19	12 ROW PLOT	6 - ENTO	DP 2038 B3XF	Untreated
18	12 ROW PLOT - Orthene	7 - ENTO	DP 2038 B3XF	Treated
17	PGR	PGR x variety	DP 2211 B3TXF	UTC
16	12 Row Plots	PGR x variety	DP 2115 B3XF	UTC
15		PGR x variety	DP21R4123B3TXF	UTC
14	42000 Planted	PGR x variety	DP21R4127B3TXF	UTC
13		PGR x variety	DP 2131 B3TXF	UTC
12		PGR x variety	DP21R4128B3TXF	UTC
11		PGR x variety	DP21R4132B3TXF	UTC
10		PGR x variety	DP 2239 B3XF	UTC
9	BORDER	BORDER	DP 1646 B2XF	AGGRESSIVE
8	12 Row Plots	PGR x variety	DP 2211 B3TXF	AGGRESSIVE
7		PGR x variety	DP 2115 B3XF	AGGRESSIVE
6		PGR x variety	DP21R4123B3TXF	AGGRESSIVE
5	42000 Planted	PGR x variety	DP21R4127B3TXF	AGGRESSIVE
4		PGR x variety	DP 2131 B3TXF	AGGRESSIVE
3		PGR x variety	DP21R4128B3TXF	AGGRESSIVE
2		PGR x variety	DP21R4132B3TXF	AGGRESSIVE
1		PGR x variety	DP 2239 B3XF	AGGRESSIVE

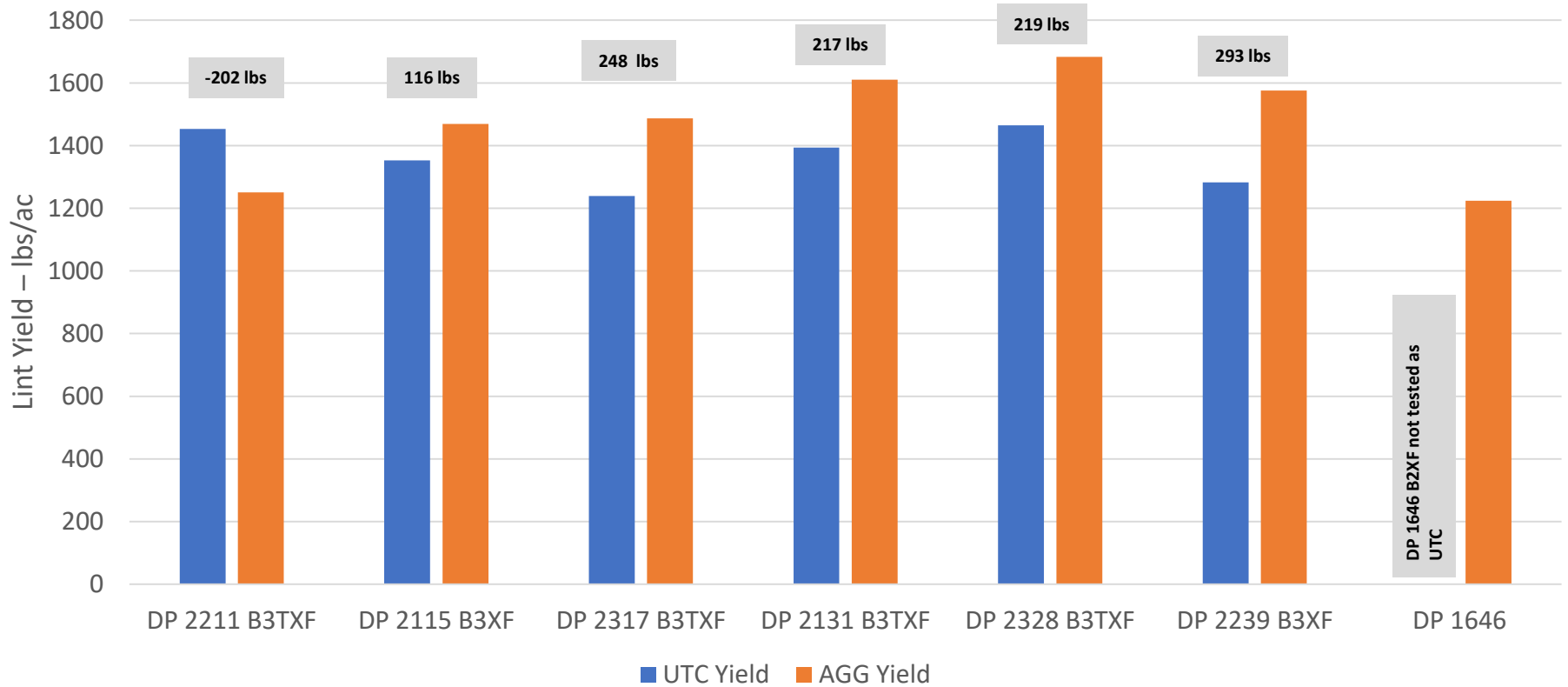
C	D	E	K	L
Trt #	Variety	Treatment	Lint/ac	
1 - AGRO	DP 2131 B3TXF	Threshold Treated- High Input	1577	
2 - AGRO	DP 1646 B2XF	Threshold Treated- High Input	1328	
3 - AGRO	DP 2211 B3TXF	Threshold Treated- High Input	1604	
4 - AGRO	DP 2127 B3XF	Threshold Treated- High Input	1685	
5 - AGRO	DP 2131 B3TXF	Threshold Treated- Low Input	1278	
6 - AGRO	DP 1646 B2XF	Threshold Treated- Low Input	1127	
7 - AGRO	DP 2211 B3TXF	Threshold Treated- Low Input	1099	
8 - AGRO	DP 2127 B3XF	Threshold Treated- Low Input	1330	
1 - ENTO	DP 2131 B3TXF	Threshold Treated- High Entomological Input	1607	
2 - ENTO	DP 2038 B3XF	Threshold Treated- High Entomological Input	1698	
3 - ENTO	DP 2131 B3TXF	Threshold Treated- Low Entomological Input	1478	
4 - ENTO	DP 2038 B3XF	Threshold Treated- Low Entomological Input	1450	
5 - ENTO	DP 2131 B3TXF	Untreated for thrips and Lygus	1335	
6 - ENTO	DP 2038 B3XF	Untreated for thrips and Lygus	1152	
7 - ENTO	DP 2038 B3XF	Treated for thrips - UTC for Lygus	1252	

Cotton – 01 – B3TXF Varieties – PGR/Growth Habit Evaluations

Final Plant Height - Inches - SLC -2022 – Field D5



Cotton – 01 – B3TXF Varieties – PGR/Growth Habit Evaluations Yield – lbs/ac - SLC -2022 – Field D5

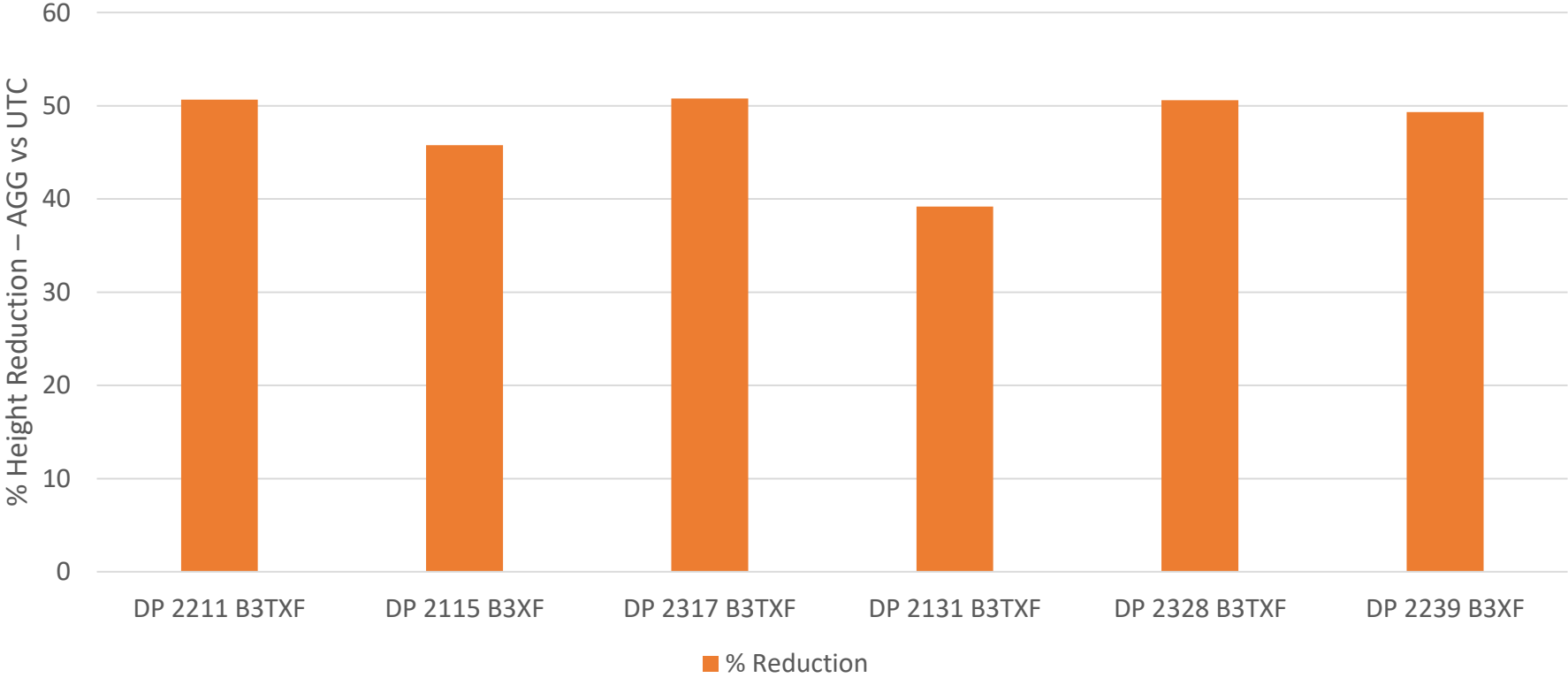


The Boll-O-Meter - 2023



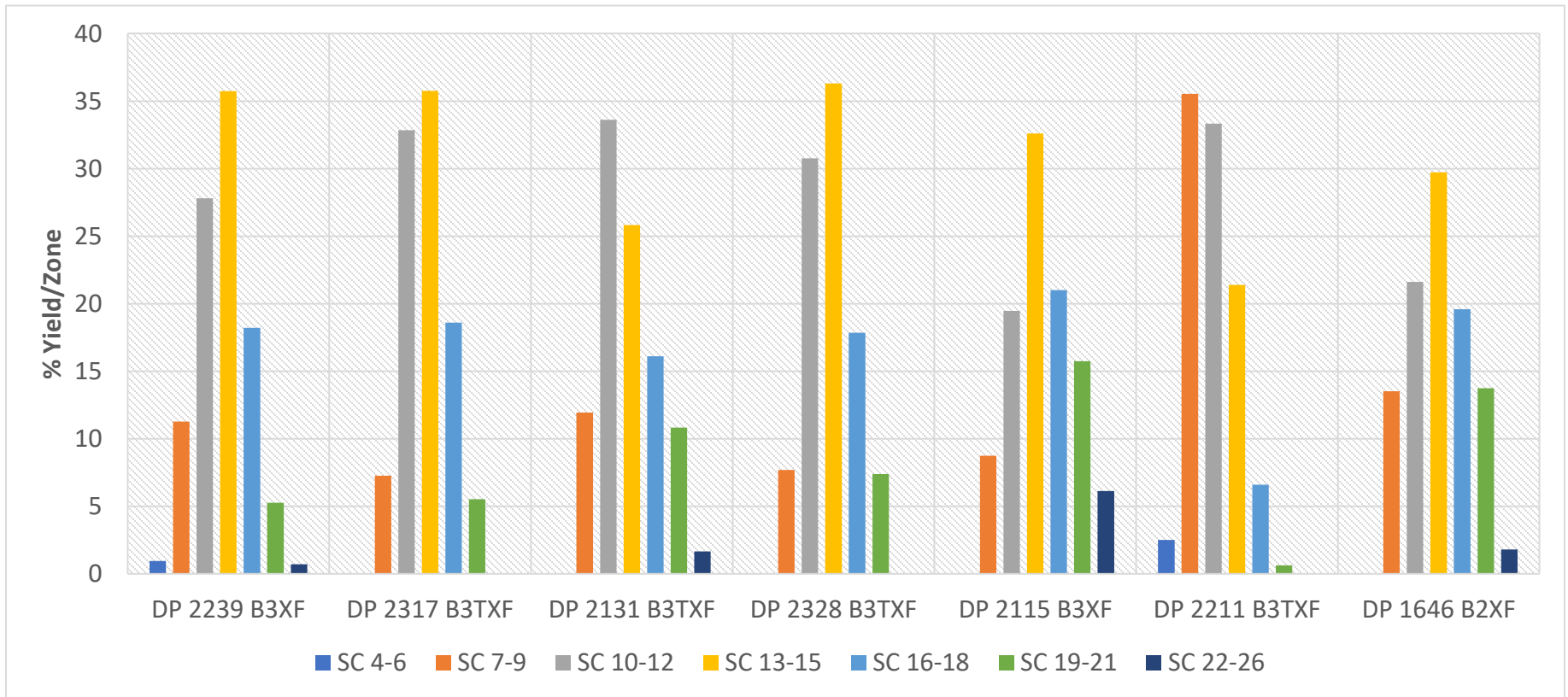
Cotton – 01 – B3TXF Varieties – PGR/Growth Habit Evaluations

% Height Reduction - SLC -2022 – Field D5

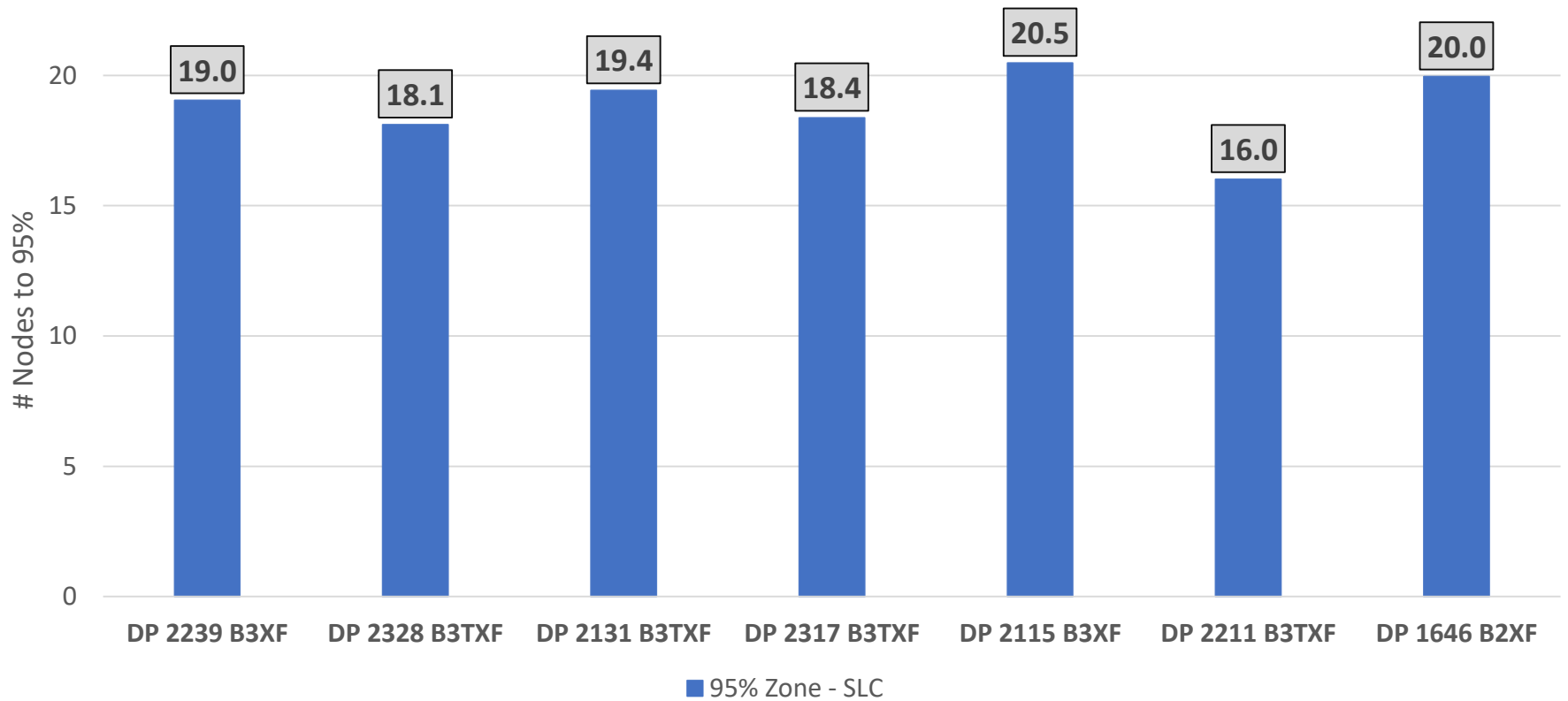


SLC – 2022 - % Total Yield/Zone

3 Nodes/Zone



Nodes to the 95% Yield Zone SLC - 2022



Thank You



Cotton Trials to Evaluate Row Configurations, Cotton Boll Locule Development, and Agronomic Interactions Involving Variety, Seeding Rate, and Row Configuration in Relation to Boll Locule Development



RESEARCH SITE DETAILS (continued)



Boll segregation process (left) and buckets (right) showing number of four locule bolls (red bucket) and five locule bolls (white bucket). Scott, MS (2021)





TRIAL OBJECTIVES

Part II – Investigations into the Five Locule Boll

- A long-standing cotton mystery has been the five locule boll, which occurs at some level in most cotton fields.



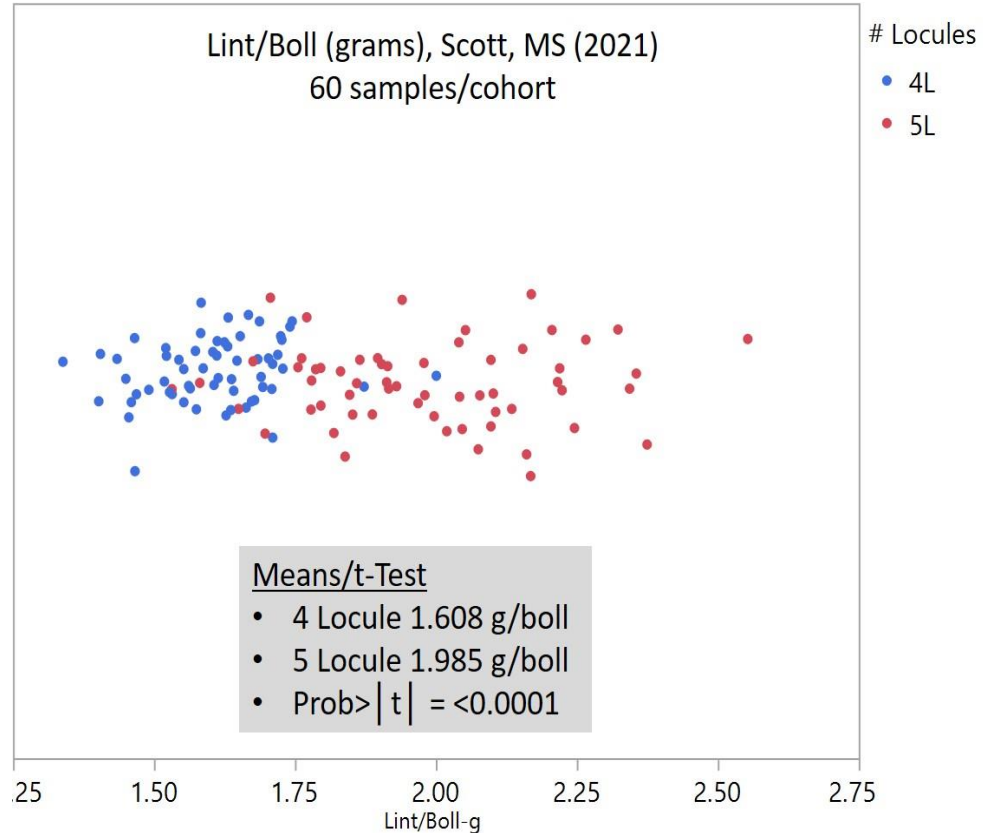
Four and five locule bolls. Scott, MS (2021)

UNDERSTANDING THE RESULTS (continued)

Part II - Investigations into the Five Locule Boll

Lint/boll in grams
(significantly more for
five locule bolls)

Lint weight (grams) for four
and five locule bolls at Scott,
MS (2021).



UNDERSTANDING THE RESULTS (continued)

○ Agronomic influences on locule development in cotton:

- The percentage of five locule bolls appears to range from very few (4%) to around 35% depending on the variety x row configuration x seeding rate combination.

Average percent of five locule bolls by variety and seeding rates averaged across the 38-inch skip row (2:1) and 38-inch solid row configurations at Scott, MS (2021).

Deltapine® Brand	Seeds/acre and Percent of Five Locule Bolls			
	20,000	30,000	40,000	50,000
Variety				
DP 2020 B3XF	15.39	13.92	15.39	9.37
DP 2127 B3XF	25.21	16.66	14.07	13.82
DP 2038 B3XF	35.72	19.66	23.97	20.61
DP 1646 B2XF	20.99	13.51	13.44	8.23
DP 2055 B3XF	14.06	10.81	4.28	7.63
Grand Total	22.27	14.91	14.23	11.93

Data is averaged **across the 38-inch Skip Row (2:1) and 38-inch solid plantings** since they were numerically similar.



UNDERSTANDING THE RESULTS (continued)

Averaged across the three row configurations, varieties, and seeding rates in the trial, five locule bolls accounted for 13.43% of the bolls which contributed 16.03% of the harvested dry weight for a yield gain associated to five locule bolls of 2.62%.

- This gain can be scaled to the number of five locule bolls contained in each treatment combination to roughly estimate the contribution made to yield.

Average percent of five locules for each seeding rate and average percent harvested weight attributed to five locule bolls at Scott, MS (2021).*

Seeding Rate Seeds/acre	Average Percent of Five Locule Bolls for Each Seeding Rate	Average Percent of Harvested Weight Attributed to Five Locule Bolls
20,000	18.62	21.99
30,000	12.80	15.42
40,000	11.94	14.30
50,000	10.34	12.40
Grand Total	13.43	16.03

*Averaged across the three row configurations.



Thank You





RESEARCH SITE DETAILS

- All PGR plots were treated with labeled but varying rates and application timings of currently available mepiquat chloride (standard 4.2% formulation). These application rates and timings were used to separate differences in Deltapine® brand cotton variety responses and not necessarily to provide specific guidance on PGR management for an individual field, farm, or variety.
- Application regimes (Table 1) included:
 - Untreated with PGR
 - Passive Treatments – represents relatively lower rate/later timing
 - Aggressive Treatments – Applied at labeled timings and within the max product use per season 48 ounces /acre.
- The various treatments are used to separate possible differences in varietal response not necessarily to provide specific guidance specific.

Regime	Treatment	Number of Cotton Nodes at PGR application	PGR Rate (ounces/acre)
PASS	1	10 - 12	8 - 10
	2	15 - 17	10 - 12
	3	20 - 21	16
AGG	1	8 - 9	16
	2	12 - 13	16
	3	15 - 16	16

Table 1. Passive and aggressive PGR treatment rates and application timings.

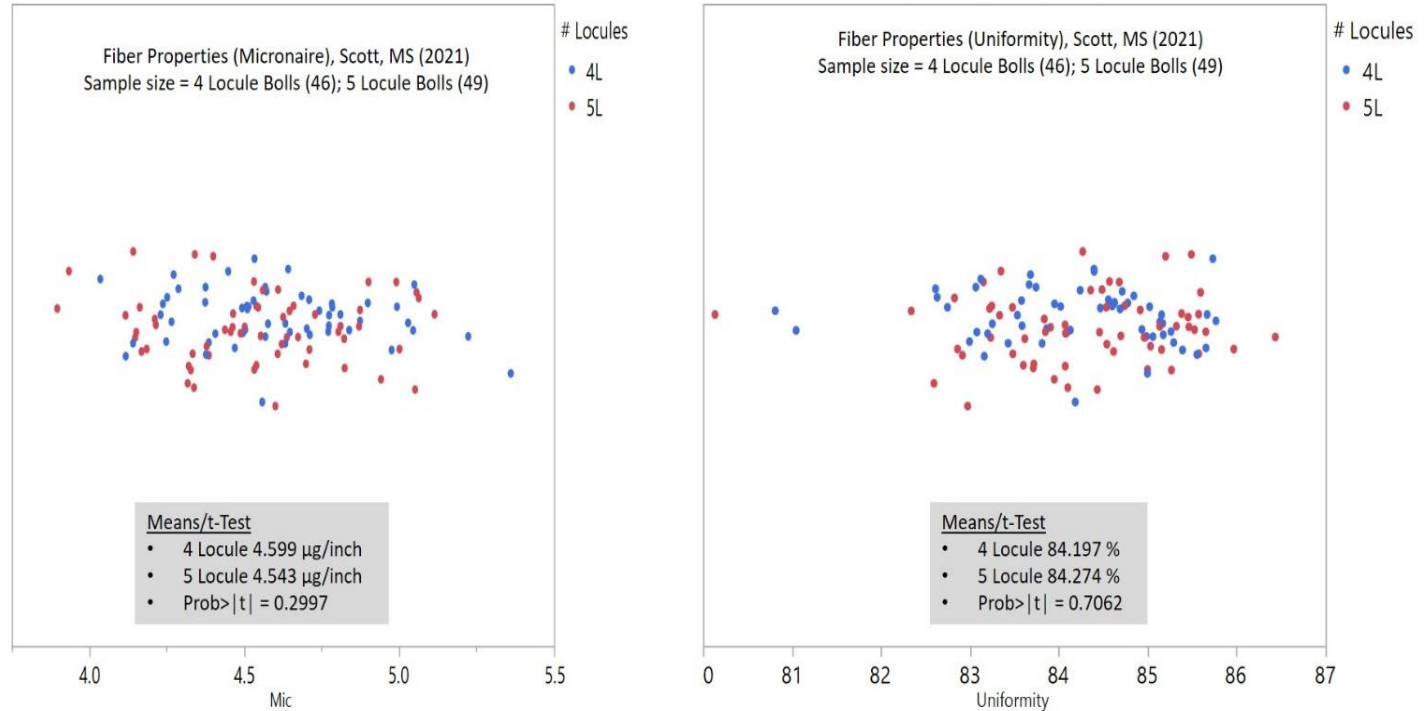


UNDERSTANDING THE RESULTS (continued)

Part II - Investigations into the Five Locule Boll

Fiber quality - Micronaire, and uniformity were similar for four and five locule bolls).

Micronaire and Uniformity of Four and Five Locule Bolls, Scott, MS (2021)



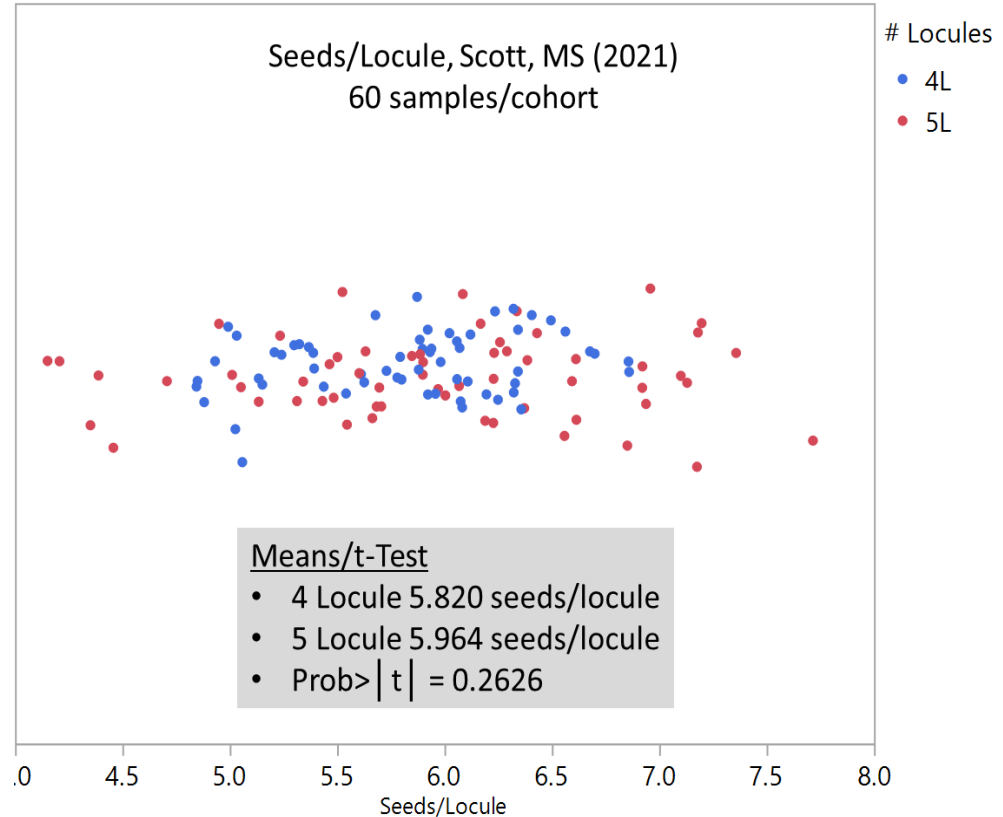
Micronaire and uniformity of four and five locule bolls, Scott, MS (2021).

UNDERSTANDING THE RESULTS (continued)

Part II - Investigations into the Five Locule Boll

Number seed/locule (similar for four and five locule bolls).

Counted seeds per locule in four and five locule bolls, Scott, MS (2021).



UNDERSTANDING THE RESULTS (continued)

Gross conclusions:

- Five locule bolls are roughly 20% larger versus four locule bolls including seed cotton weight, lint weight, and seed weight.
- The fiber quality of five and four locule bolls is similar.



UNDERSTANDING THE RESULTS (continued)

- **Part II B – Agronomic influences on locule development in cotton.**
 - **Background** – Historical (1920's) and recent literature indicates that locule (4 or 5) determination occurs about 24-28 days prior to bloom.^{1,2} Most cotton bolls in *Gossypium hirsutum* start with 5 locules and drop to 4 based on carbohydrate status. Typically, less available energy leads to reductions in locule number from 5 to 4. The determination is based mainly on the status of carbohydrate production; higher carbohydrate amounts preserve more five locule bolls.



¹Robertson, B., Bednarz, C., and Burmester, C. 2007. Growth and development – first 60 days. Cotton Physiology Today. Vol. 13, No. 2. National Cotton Council.

<https://www.cotton.org/tech/physiology/cpt/plantphysiology/upload/Growth-and-Development-First-60-Days-NOSUBSCRIBE.pdf>.

²Oosterhuis, D., Stewart, M., and Guthrie, D. 1994. Cotton fruit development: The boll. Cotton Physiology Today. Vol. 5, No. 7. National Cotton Council.

<https://www.cotton.org/tech/physiology/cpt/plantphysiology/upload/CPT-Aug94-REPOP.pdf>.

UNDERSTANDING THE RESULTS (continued)

- **Factors to consider in carbohydrate availability** – All field effects that influence the production and availability of carbohydrates should be considered including:
 - **Reduced production** – Due to cloudy weather, fertility availability, water logging, drought, and other factors.
 - **Plant to plant competition** – This leads to increased vegetative development and can decrease carbohydrate availability, particularly when not managed properly. It is also a primary driver of why differences among populations were observed.
 - **Vegetative growth** – Any factor that leads to excess vegetative development can reduce carbohydrate availability to the rest of the plant. This can be managed using PGRs and for that reason PGR use is a factor to consider since it is primarily used to balance vegetative and reproductive growth.

UNDERSTANDING THE RESULTS (continued)

- **Agronomic influences on locule development in cotton:**
 - Variety is a huge component for locule number determination.
 - Some varieties (particularly DP 2038 B3XF in this study) produce more (as much as 3X) five locule bolls through various seeding rates. This may explain the impact on yield potential and the increase (mysterious) in turnout in some fields.

Average percent of five locule bolls by variety and seeding rates averaged across the 38-inch skip row (2:1) and 38-inch solid row configurations at Scott, MS (2021).

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Data is averaged **across the 38-inch Skip Row (2:1) and 38-inch solid plantings** since they were numerically similar.



UNDERSTANDING THE RESULTS (continued)

Agronomic influences on locule development in cotton:

Seeding Rate

- Seeding rate effects on locule development appeared similar in all three row configurations but at different magnitudes. The 76-inch, wide row (1:1) cotton had a lower percentage of five locule bolls in almost all cases but with similar trends to the 38-inch skip row (2:1) and 38-inch solid. This is likely a result of increases in down-the-row density (plant-to-plant competition) versus the other row spacings. The data below is averaged across varieties and the three row configurations.

Average percentage of five locule bolls and average percentage of dry weight attributed to five locule bolls within three row configurations at Scott, MS (2021).

Row Configurations	Average Percentage of Five Locule Bolls	Average Percentage of Dry Weight Attributed to Five Locule Bolls
76-inch, wide row (1:1)	8.60	10.70
38-inch skip row (2:1)	14.80	17.40
38-inch solid	16.87	19.98



UNDERSTANDING THE RESULTS (continued)

Agronomic influences on locule development in cotton:

Seeding Rate

- Less plant- to plant competition (lower population) can be the trigger for improving carbohydrate availability. There seems to be a plant density (down the row not the land acre) effect, which is why the 76-inch, wide row (1:1) spacing responded differently. We must remember that even though the row configurations contain similar numbers of plants on the land acre they are as much as half the distance apart down the row. This apparently introduces plant to plant competition that can cause a long-lasting impact throughout the growing season.

Average percentage of five locule bolls and average percentage of dry weight attributed to five locule bolls within three row configurations at Scott, MS (2021).

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38-inch solid	16.87	19.98



UNDERSTANDING THE RESULTS (continued)

Agronomic influences on locule development in cotton:

- Row Configuration
 - The data below is averaged across variety and seeding rate within the row configurations.
 - 38-inch solid row and 38-inch skip row (2:1) plantings were similar in the percentage of five locule bolls.

Average percentage of five locule bolls and average percentage of dry weight attributed to five locule bolls within three row configurations at Scott, MS (2021).

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38-inch solid	16.87	19.98



UNDERSTANDING THE RESULTS (continued)

Agronomic influences on locule development in cotton:

- Row Configuration
 - The 76-inch (1:1) row plantings developed about 50% less (8.60%) five locule bolls versus the 38-inch solid and 38-inch (2:1) skip row plantings which were 16.87% and 14.80%, respectively.
 - This is likely the result of increased plant to plant competition down the row in the 76-inch (1:1) plantings and will be focus of further research.

Average percentage of five locule bolls and average percentage of dry weight attributed to five locule bolls within three row configurations at Scott, MS (2021).

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38-inch solid	16.87	19.98



UNDERSTANDING THE RESULTS (continued)

Agronomic influences on locule development in cotton:

- Row Configuration
 - Similar percentage increases of relative dry weight can be attributed to five locule bolls in the three row configurations.
 - An explanation may be that the average percentage of five locule bolls equals the percentage of the bolls in the treatment combination with five locules. The average percentage of five locule boll weight is the percentage of the dry weight that they contributed to yield.

Average percentage of five locule bolls and average percentage of dry weight attributed to five locule bolls within three row configurations at Scott, MS (2021).

Row Configurations	Average Percentage of Five Locule Bolls	Average Percentage of Dry Weight Attributed to Five Locule Bolls
76-inch, wide row (1:1)	8.60	10.70
38-inch skip row (2:1)	14.80	17.40
38-inch solid	16.87	19.98

2021 Result

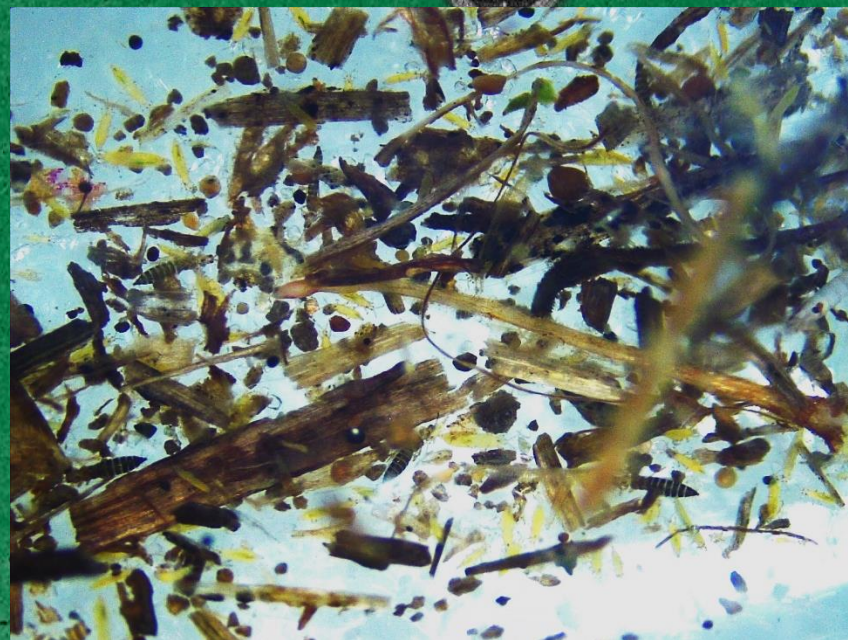
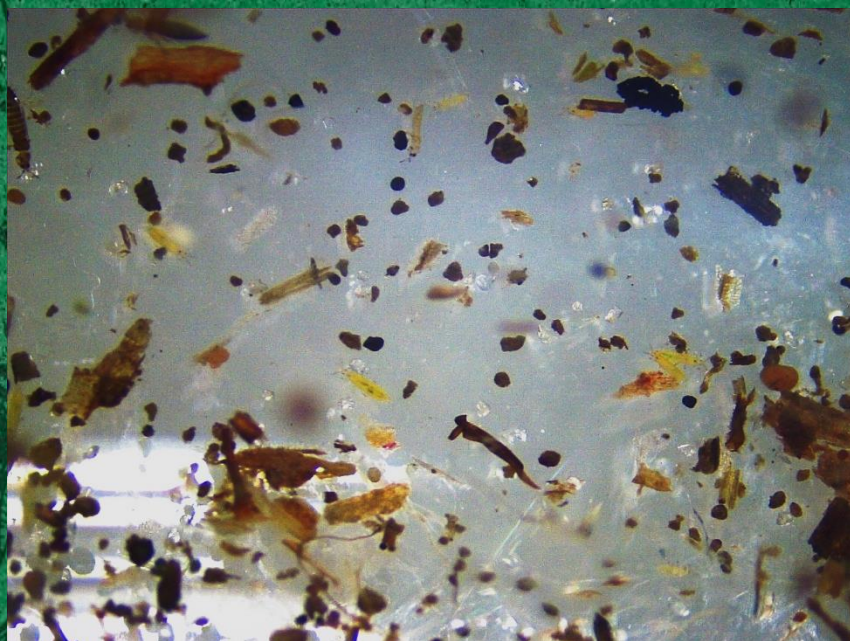


Thrips Samples - 6/21/2012 - SLC

DP 2131 B3TXF - ThryvOn (left) vs DP 1646 B2XF (right)
6 Leaf Cotton – PRELIMINARY DATA

DP 2131 B3TXF – No/minimal feeding damage
≈11 Thrips/plant

DP 1646 B2XF – Moderate feeding damage
≈84 Thrips/plant



KEY LEARNINGS

- Wider row spacings can produce acceptable yields; however, potential yield may be limited versus solid plantings.
- Growers should carefully consider variety selection and placement when choosing a wide row or skip row configuration.
- Seeding rate management appears to be a useful tool for managing vegetative development in cotton without greatly sacrificing yield potential.



KEY LEARNINGS (continued)

- **Five locule bolls, when present, are roughly 20% bigger, have similar fiber qualities, and offer greater contributions to yield potential than four locule bolls when considered on an individual basis; however, all bolls are important and four locule bolls remain the primary contributors to yield potential.**
- Agronomic factors that include variety selection, seeding rates, row configuration, drought, irrigation, and other factors influence the development and number of five locule bolls.
- Please see your local Deltapine® brand representative for more information.



SOURCES

Sources:

¹Robertson, B., Bednarz, C., and Burmester, C. 2007. Growth and development – first 60 days. Cotton Physiology Today. Vol. 13, No. 2. National Cotton Council.

<https://www.cotton.org/tech/physiology/cpt/plantphysiology/upload/Growth-and-Development-First-60-Days-NOSUBSCRIBE.pdf>.

²Oosterhuis, D., Stewart, M., and Guthrie, D. 1994. Cotton fruit development: The boll. Cotton Physiology Today. Vol. 5. No. 7. National Cotton Council.

<https://www.cotton.org/tech/physiology/cpt/plantphysiology/upload/CPT-Aug94-REPOP.pdf>.





UNDERSTANDING THE RESULTS

2021 DEKALB® Brand response to planting population.
Single site, non-replicated trial near Scott, Mississippi

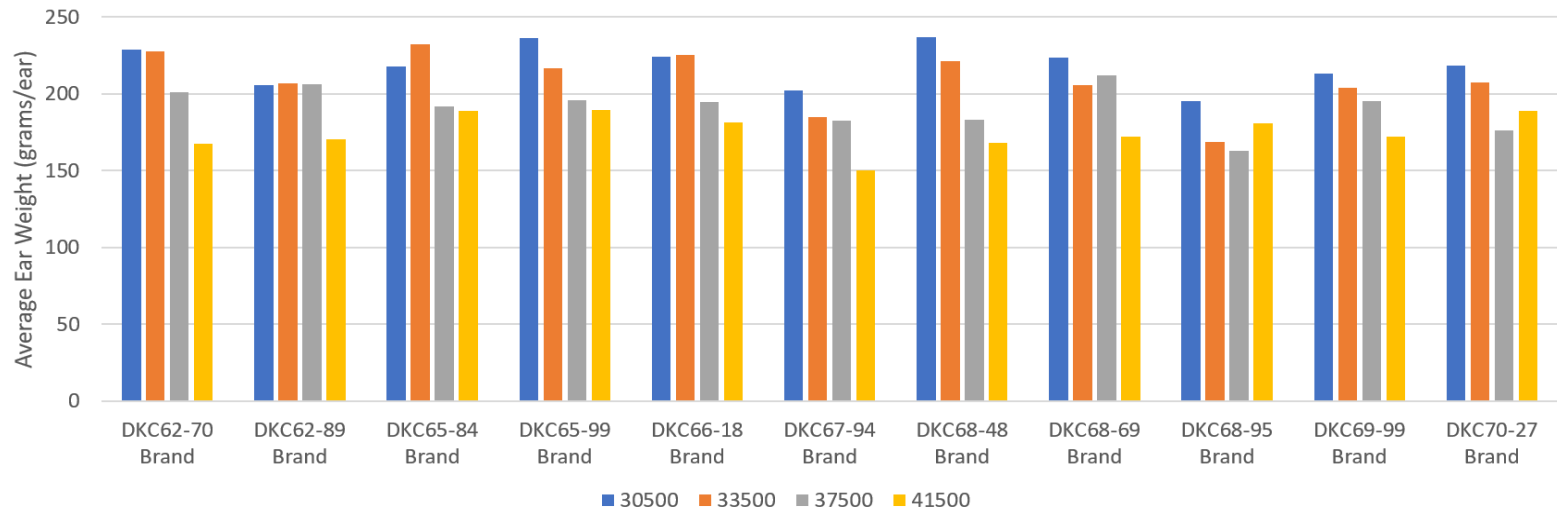


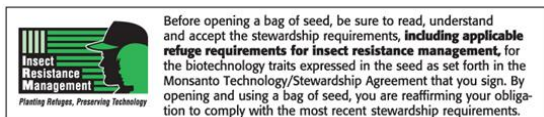
Figure 3. 2021 average ear weight of 11 DEKALB® corn products by planting population near Scott, Mississippi.



LEGAL STATEMENTS

The information discussed in this report is from a **single site, unreplicated** demonstration. This informational piece is designed to report the results of this demonstration and is not intended to infer any confirmed trends. Please use this information accordingly.

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RESULTS & DISCUSSION



ROW CONFIGURATIONS IN COTTON PRODUCTION

SCOTT LEARNING CENTER



RESEARCH SITE DETAILS

Location	Soil Type	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield (lb/acre)	Seeding Rate (seeds/acre)
Scott, MS	Commerce silt loam	Corn	Conventional	5/30/19	10/22/19	2000	30K, 40K, 50K

Two Deltapine® cotton varieties,

- DP 1646 B2XF and
- DP 1845 B3XF

were planted in three different row configurations:

- solid planted 38-inch rows
- 38-inch 2:1 skip row, and
- 38-inch 1:1 skip row (equivalent to 76-inch solid row spacing).



Figure 1. DP 1646 B2XF planted in 2:1 38-inch rows (left) and 76-inch row spacing (right) at 40,000 seeds/acre.

ROW CONFIGURATIONS IN COTTON PRODUCTION

UNDERSTANDING THE RESULTS

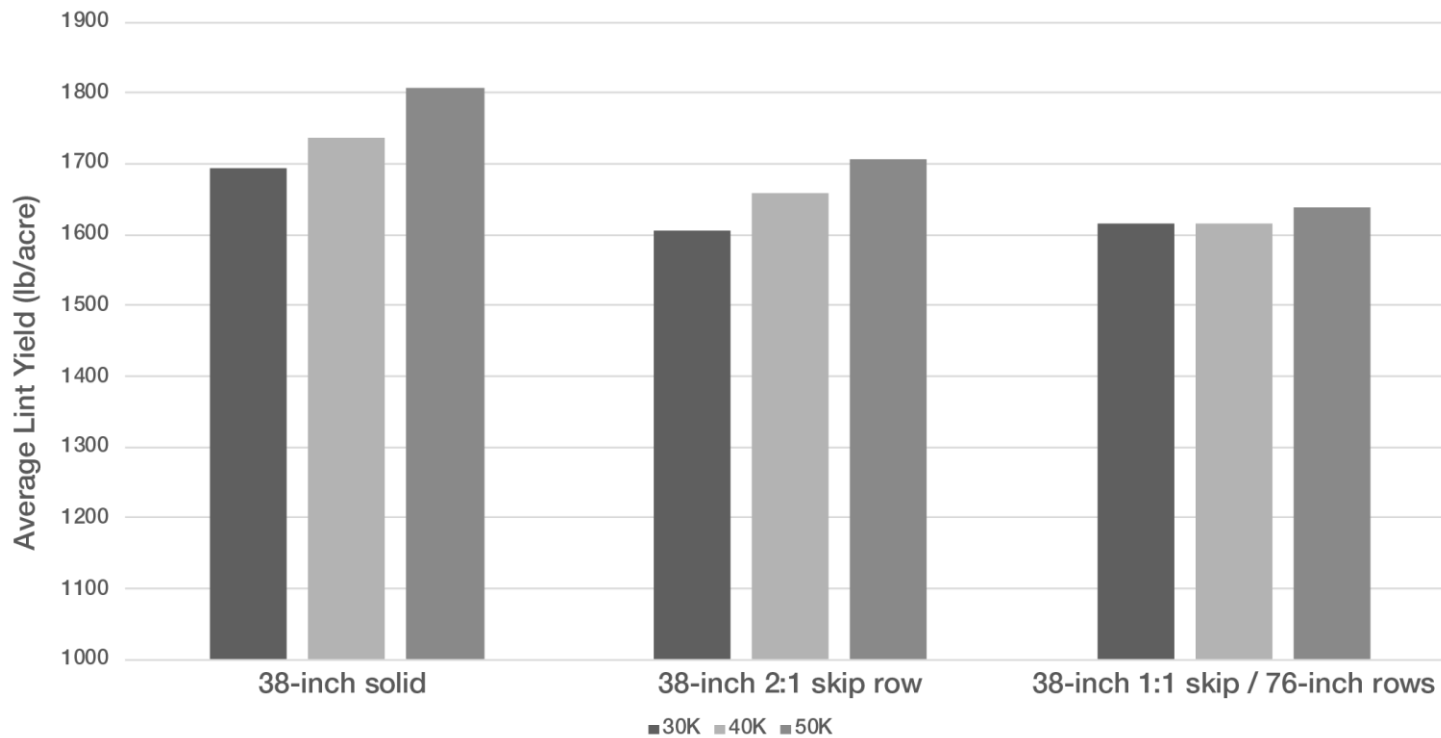


Figure 2. Average lint yield (lb/acre) across varieties tested by row configuration and seeding rate.



ROW CONFIGURATIONS IN COTTON PRODUCTION

UNDERSTANDING THE RESULTS

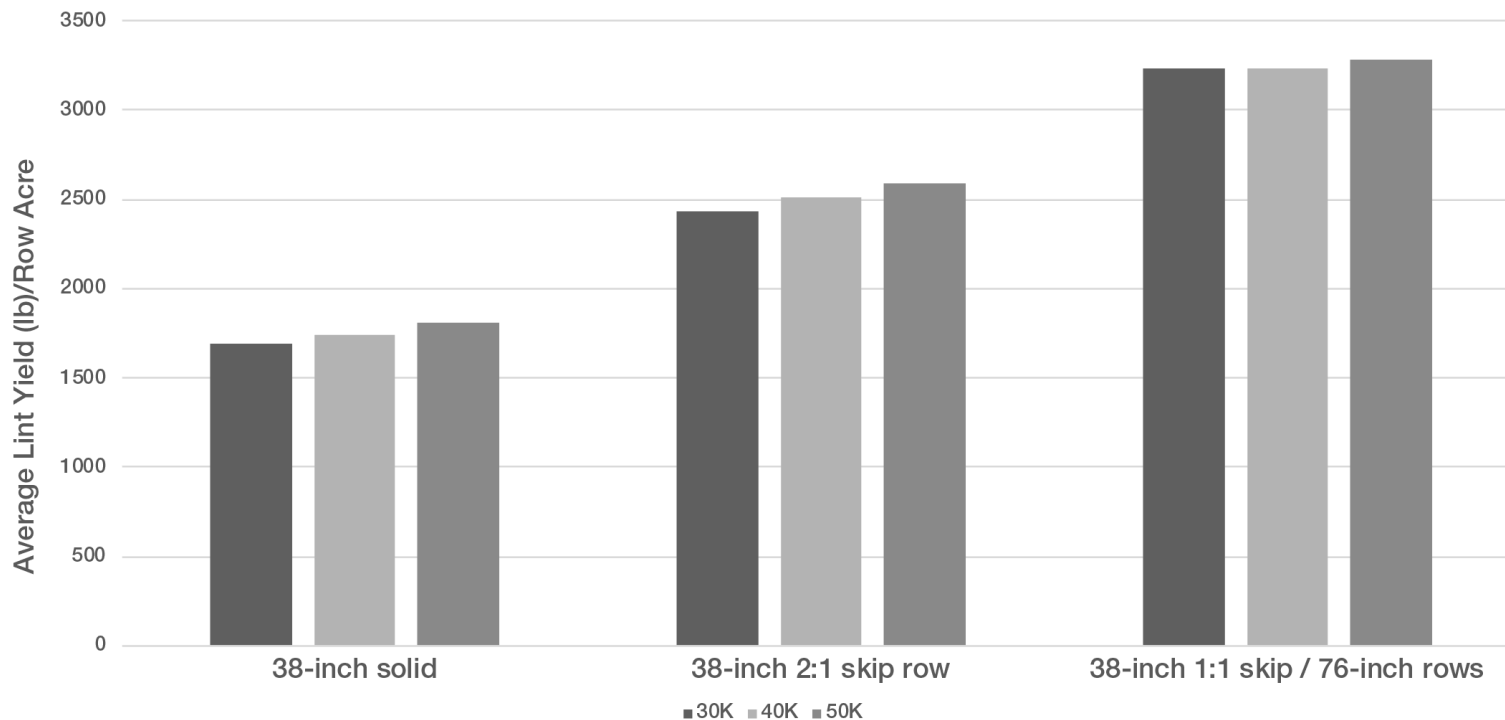


Figure 3. Average lint yield on a per row acre basis across varieties tested by row configuration and seeding rate.



TRIAL OBJECTIVES

Part I – Cotton Row Configuration

- Cotton planted on wider rows (up to 80-inches apart) has been a major point of discussion around the cotton industry for several years.
- Wide row and skip row plantings have several, potential advantages over solid planting:
 - Equipment standardization across crops
 - Reduced potential for excess vegetative growth via reduced plant to plant competition
 - Reductions in input costs from lower seeding cost and or banding of inputs.



TRIAL OBJECTIVES (continued)

Part I – Cotton Row Configuration (continued)

- Questions remain regarding variety selection, appropriate management, and yield potential in wider row cotton plantings.
- This study was initiated at the Bayer Learning Center at Scott, MS to evaluate the potential of wide row cotton plantings in the production system.



TRIAL OBJECTIVES (continued)

Part II – Investigations into the Five Locule Boll (continued)

Questions regarding five locule bolls versus four locule bolls include:

- Do five locule bolls weigh more than four locule bolls?
- Do five locule bolls produce more seed and/or lint per boll than four locule bolls?
- What is the relative fiber quality of five versus four locule bolls?
- What contribution do five locule bolls make to lint yield?
- What factors can potentially influence the development of five locule bolls?



TRIAL OBJECTIVES (continued)

Part II – Investigations into the Five Locule Boll (continued)

- This study was an offshoot of the row configuration work.
- This work helps to explain the agronomic impacts on boll locule number and some of the compensatory mechanisms that cotton shows at reduced populations.
- Some variety effects were also evaluated and are included in this analysis.



TRIAL OBJECTIVES (continued)

Part II B – Agronomic Interactions

- Agronomic factors that influenced the development of five locule bolls included:
 - Seeding rate
 - Planting density down the row
 - Variety
 - Row configuration.



RESEARCH SITE DETAILS

Location	Soil Type	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield (lb/acre)	Seeding Rate (seeds/acre)
Scott, MS	Silty/Sandy, clay loam	Corn	Conventional	5/15/2021	10/15/2021	1750	See Below

- Seeding rates per land acre
 - 20,000
 - 30,000
 - 40,000
 - 50,000



RESEARCH SITE DETAILS (continued)

- Plots were approximately one acre each.
- Weed and insect controls were applied at local standard rates and timings.
- Nitrogen at a rate of 85 lb/acre was applied as 28-0-0-5 (N-P-K-S).



RESEARCH SITE DETAILS (continued)

- Row configurations planted:
 - 38-inch Solid
 - 38-inch Skip Row (2:1) – 2 rows planted, 1 row skipped
 - 76-inch Wide Row (1:1) – Effectively 1:1 skip row 38-inch
(This is planted as a proxy for 60-inch rows. The Learning Center does not have 30-inch equipment and cannot effectively plant 60-inch rows due to drainage issues on 30-inch beds; therefore, 76-inch rows are used.)



RESEARCH SITE DETAILS (continued)

- Deltapine® brand cotton varieties planted:
 - DP 2020 B3XF (early to mid-maturity)
 - DP 2127 B3XF (early to mid-maturity)
 - DP 2038 B3XF (mid-maturity)
 - DP 1646 B2XF (mid-maturity to full season)
 - DP 2055 B3XF (full season)



UNDERSTANDING THE RESULTS (continued)

- Comments about results:
 - While the solid plantings were higher yielding, several of the wider/skip row treatment combinations showed average yields of 1300+ lb lint/acre. Growers should acknowledge this limitation before pursuing either alternative row spacing as a production practice.
 - Variety selection should be carefully evaluated before selecting a variety for wide row production.
 - **An important note** – these differences are likely to narrow as row configuration moves closer to 60-inches but may also remain. Further investigation is warranted.



UNDERSTANDING THE RESULTS (continued)

Seeding Rates

- Seeding rate is a factor many growers use to moderate vegetative development and supplement or improve the effectiveness of PGR applications.
- Seeding rate appears to be optimized in this study between 30,000 to 40,000 seeds/acre. This agrees with commercial practice.
- It appears that reducing the seeding rate in solid row plantings does not greatly decrease yield potential.
- Yields appeared to be slightly higher in the 76-inch, wide rows (1:1) at the lowest seeding rates (slide 19) but at levels of 300 to 400 lb lint/acre lower than in the solid plantings (slide 18). This points out one fundamental limitation of the wide row planting.
- Growers should carefully evaluate seeding rate decisions and variety response when a change is being considered. However, cotton yield potential appears to be very high even at relatively low seeding rates.



UNDERSTANDING THE RESULTS (continued)

- **Part II - Investigations into the Five Locule Boll**

- In the previously discussed row configuration study, the plots were positionally mapped and the bolls were grouped into cohorts of either four or five locule containing bolls.
- Six-row feet from each plot, which contained a varying number of plants depending on seeding rate and emergence, were mapped. Data not shown.
- 11,633 bolls were mapped, categorized, delinted, and counted from the plots.
 - 10,105 bolls were categorized as four locule (86.4%)
 - 1,528 bolls were categorized as five locule (13.4%)



UNDERSTANDING THE RESULTS (continued)

Part II - Investigations into the Five Locule Boll

- Bolls were weighed, ginned, High Volume Instrument (HVI) testing completed on the fiber, seed delinted, and seeds were counted.
 - Boll size evaluations and data from this step included:
 - Seed cotton/boll in grams (significantly more for five locule bolls).
 - Lint/boll in grams (significantly more for five locule bolls).
 - Number of seed/boll (significantly more for five locule bolls).
 - Number seed/locule (similar for four and five locule bolls).
 - Turnout - % Lint versus seed cotton (similar for four and five locule bolls).
 - Fiber quality - Length, strength, micronaire, and uniformity (all similar for four and five locule bolls).



UNDERSTANDING THE RESULTS (Yield)

- Average yield of all products in the study was 241 bu/acre, which was exceptional for the Delta system. Highest yield was 274.58 and the lowest was 212.51.

DEKALB® Brand Corn Product	Average Yield (bu/acre at 15.5% Moisture Content) and Four Seeding Rates				Average Yield (bu/acre)	Gain in bu/acre from 30,000 to 38,000 seeds/acre	Gross \$ Return from 30,000 to 38,000 seeds/acre	Seed Cost (\$) (1000 seeds)	Average Net \$ Return from 30,000 to 38,000 seeds/acre
	30,000	34,000	38,000	41,000					
DKC62-05	221.77	226.92	236.37	239.37	231.11	14.60	84.98	24.00	60.98
DKC65-93	246.80	250.86	257.15	264.84	254.91	10.35	60.26	24.00	36.26
DKC65-99	253.57	260.92	269.79	274.58	264.71	16.22	94.40	30.00	64.40
DKC66-94	212.51	219.70	229.17	231.73	223.28	16.66	96.96	24.00	72.96
DKC67-70	239.61	247.42	242.91	248.46	244.60	3.30	19.20	24.00	-4.80
DKC68-24	219.33	215.71	235.94	219.46	222.61	16.61	96.65	24.00	72.65
DKC70-25	239.95	241.02	242.96	249.60	243.38	3.02	17.56	24.00	-6.44
Averages	233.36	237.51	244.90	246.86	240.66	11.54	67.14	24.86	42.29



UNDERSTANDING THE RESULTS

Table 1. 2021 economic effect of seeding rate on corn productivity near Scott, Mississippi. This data is from a single site, non-replicated trial. Average gross income was adjusted for seed cost using an estimated \$3.75 per 1,000 seed across all corn products, and corn price at \$5.82/bu.

DEKALB® Corn Brand	Corn Seeding Rate (seeds/acre)				30500 vs 37500 Average Yield Difference (bu/acre)	\$ Gross Increase (or Decrease) per acre	Seed Cost (per 7000 seeds)	Net return on investment 30500 vs 37500 seeds per acre
	30500	33500	37500	41500				
DKC62-70 Brand	256.9	245.3	254.2	246.5	(2.72)	\$ (15.83)	\$ 26.25	\$ (42.08)
DKC62-89 Brand	215.8	235.0	219.8	242.8	4.00	\$ 23.26	\$ 26.25	\$ (2.99)
DKC65-84 Brand	256.7	260.2	274.1	270.7	17.40	\$ 101.26	\$ 26.25	\$ 75.01
DKC65-99 Brand	247.3	253.0	260.4	257.2	13.17	\$ 76.66	\$ 26.25	\$ 50.41
DKC66-18 Brand	262.9	259.4	275.3	281.4	12.46	\$ 72.51	\$ 26.25	\$ 46.26
DKC67-94 Brand	232.1	238.0	227.1	238.3	(4.98)	\$ (28.98)	\$ 26.25	\$ (55.23)
DKC68-48 Brand	249.2	260.0	274.8	268.2	25.61	\$ 149.07	\$ 26.25	\$ 122.82
DKC68-69 Brand	248.2	257.6	258.1	255.5	9.91	\$ 57.67	\$ 26.25	\$ 31.42
DKC68-95 Brand	218.7	212.2	225.5	234.1	6.87	\$ 39.97	\$ 26.25	\$ 13.72
DKC69-99 Brand	242.1	255.9	259.8	266.9	17.78	\$ 103.50	\$ 26.25	\$ 77.25
DKC70-27 Brand	230.7	240.3	251.7	267.7	20.99	\$ 122.16	\$ 26.25	\$ 95.91



Response of DEKALB® Brand Roundup Ready® Corn 2 Products to Seeding Rate (2021)

Bayer Learning Center at Scott, MS



RESEARCH SITE DETAILS (continued)

- DEKALB® brand products planted
 - DKC62-05 Brand (Roundup Ready® Corn 2)
 - DKC65-93 Brand (Roundup Ready® Corn 2)
 - DKC65-99 Brand (Trecepta® Corn)
 - DKC66-94 Brand (Roundup Ready® Corn 2)
 - DKC67-70 Brand (Roundup Ready® Corn 2)
 - DKC68-24 Brand (Roundup Ready® Corn 2)
 - DKC70-25 Brand (Roundup Ready® Corn 2)

