



COTTON VARIETY RESPONSE TO DIFFERENT PGR APPLICATION REGIMES

The vegetative and reproductive growth of cotton can vary greatly depending on the variety. To control this growth, plant growth regulators (PGRs) can be used to help force a shift from vegetative to reproductive growth to establish acceptable yield potential. Cotton varieties all respond differently to PGR treatments; therefore, it is important to understand the response of new cotton varieties to PGR application rates and timing.

This demonstration was designed to show the response of new cotton varieties to different techniques of applying PGRs. To simulate differential PGR application techniques a passive regime, an aggressive regime, and an untreated check was set up and managed for each variety in the demonstration. The passive regime received a PGR application (mepiquat chloride, 4.2% formulation) of 8 ounces/acre on July 20th at 15 nodes and 10 ounces/acre on August 3rd at 19 nodes for a total in-season application of 18 ounces/acre. The aggressive regime received a PGR application of 12 ounces/acre on July 2nd at 8 nodes, 16 ounces/acre on July 20th at 15 nodes, and 20 ounces/acre on August 3rd at 19 nodes for a total in-season application of 48 ounces/acre. An untreated check was also established to help indicate the level of growth control by the two different regimes.

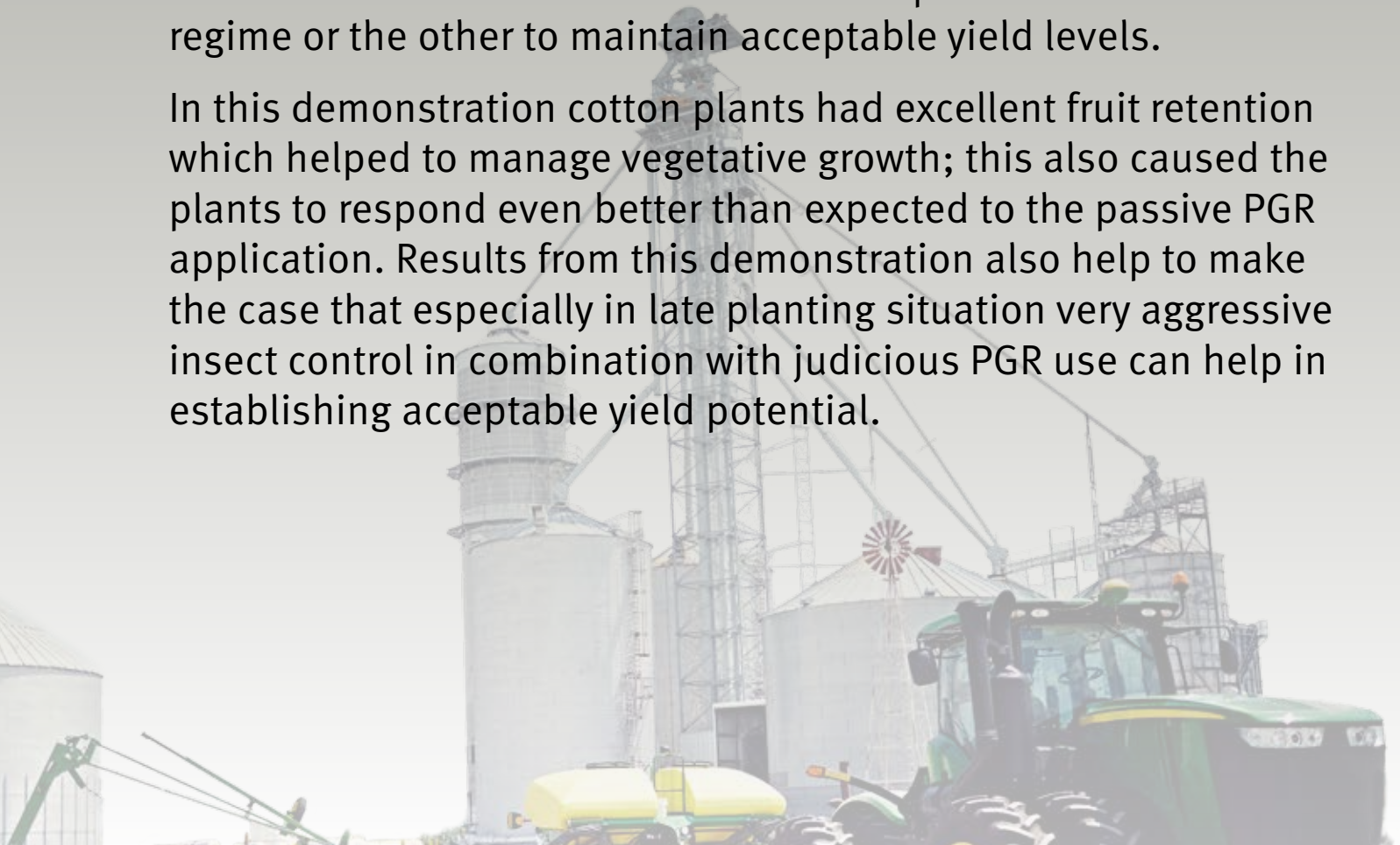


COTTON VARIETY RESPONSE TO DIFFERENT PGR APPLICATION REGIMES

The demonstration was set up to offer a 'worst case scenario' for managing cotton variety growth by planting late (on June 6th), planting at a high population (52,000 seeds/acre), and planting in soil with strong soil fertility.

When plant growth is managed properly late-planted cotton often has excellent yield potential. Many of the cotton varieties yielded over 1,500 lbs lint/acre. In this demonstration a wide response in yield was observed across the new cotton varieties even when no PGR was used. Several of the varieties required PGR use in one regime or the other to maintain acceptable yield levels.

In this demonstration cotton plants had excellent fruit retention which helped to manage vegetative growth; this also caused the plants to respond even better than expected to the passive PGR application. Results from this demonstration also help to make the case that especially in late planting situation very aggressive insect control in combination with judicious PGR use can help in establishing acceptable yield potential.



Background



- Cotton varieties all respond differently to PGR treatments.
 - It is important to understand the response of new cotton varieties to different PGR application techniques (timing and rates).
 - PGRs are used to help force a shift from vegetative to reproductive growth to establish acceptable yield potential.
- Questions asked:
 - Which varieties require more aggressive growth control?
 - Which varieties require little to no growth control?
 - How do different PGR treatments affect plant height of different varieties?
 - How do new varieties respond when planted late in the environment at the Monsanto Learning Center at Scott, MS?

Cotton Variety Response to Different PGR Application Regimes

Study Guidelines



- Treatment List:
 - Untreated check (UTC) – No growth control
 - Aggressive regime – Season total of 48 ounces/acre of mepiquat chloride (4.2% formulation).
 - 8 nodes – July 2 (12 ounces/acre)
 - 15 nodes – July 20 (16 ounces/acre)
 - 19 nodes – August 3 (20 ounces/acre)
 - Passive regime – no first application, set up for 1/2 rates of the aggressive regime Season total of 18 ounces/acre of mepiquat chloride (4.2% formulation).
 - 8 nodes – July 2 (none)
 - 15 nodes – July 20 (8 ounces/acre)
 - 19 nodes – August 3 (10 ounces/acre)

Regime	Date	Growth Stage	PGR Rate (ounces/acre)
Aggressive	July 2	8 nodes	12
	July 20	15 nodes	16
	August 3	19 nodes	20
Passive	July 2	8 nodes	0
	July 20	15 nodes	8
	August 3	19 nodes	10

Cotton Variety Response to Different PGR Application Regimes

Study Guidelines



- This demonstration was set up to offer the worst case scenario for managing cotton varieties in any system.
- The following parameters were used:
 - Late planting date
 - Planted on June 6th, 2015. One month after typical cotton planting.
 - Late planting causes rapid growth via relatively high heat accumulation and typically requires aggressive growth management.
 - High population
 - 52,000 seeds/acre, ≈ 20% higher than normal.
 - Increases interplant competition and makes growth control even more difficult.
 - Strong soil/fertility
 - Serves to make growth control more difficult.
- Harvest date: October 20, 2015

Cotton Variety Response to Different PGR Application Regimes

Results and Discussion

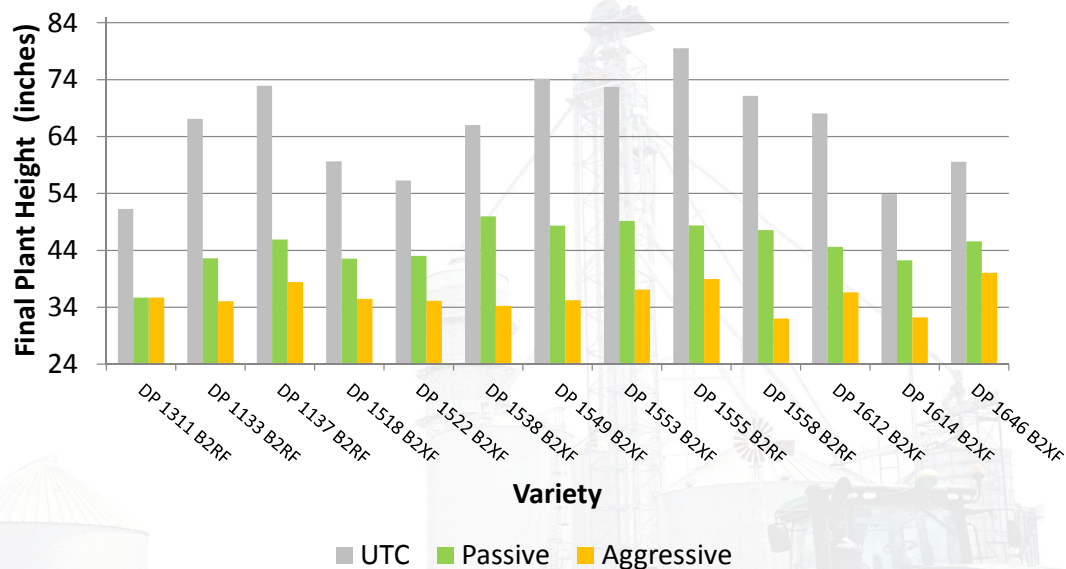


Figure 1. Height of cotton plants by variety and PGR regime.

Cotton Variety Response to Different PGR Application Regimes

Results and Discussion

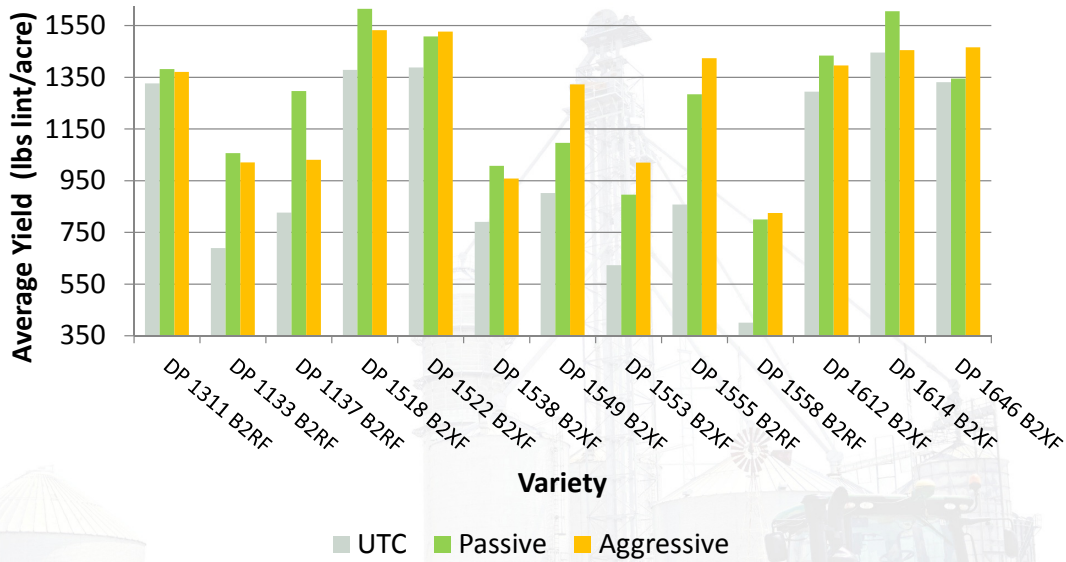


Figure 2. Cotton yield (lbs lint/acre) by variety and PGR regime.

Cotton Variety Response to Different PGR Application Regimes

Results and Discussion

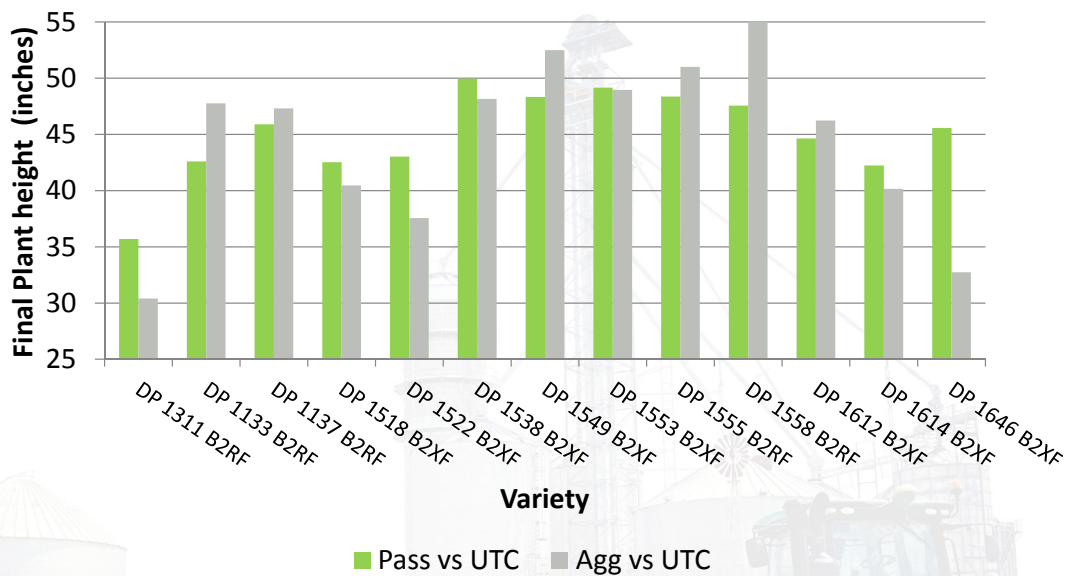


Figure 3. Cotton plant height of PGR regime when compared to untreated check.

Cotton Variety Response to Different PGR Application Regimes

Results and Discussion

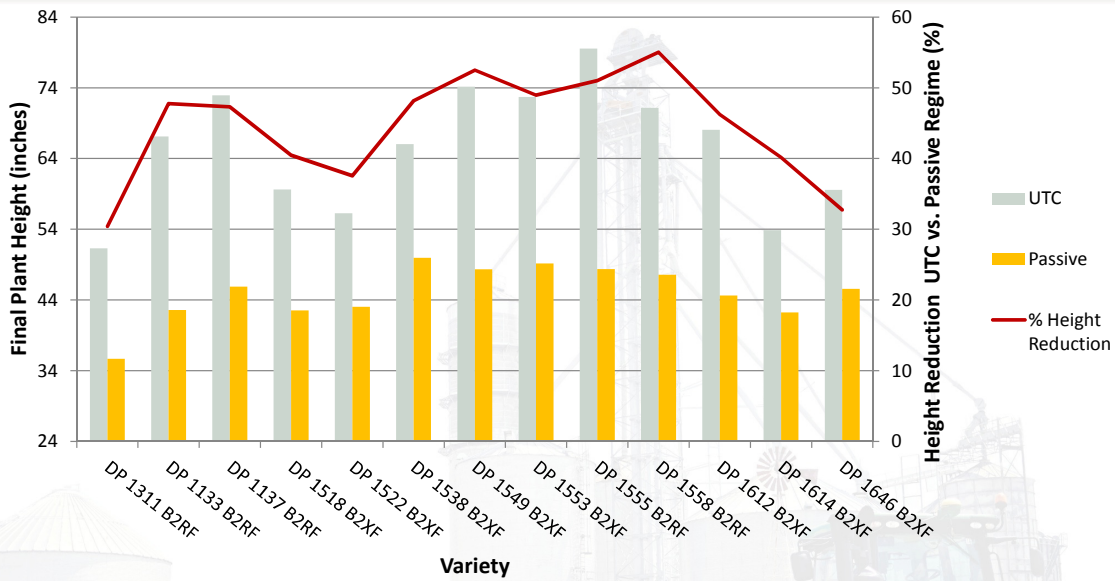


Figure 4. Final plant height of cotton by variety comparing untreated check and aggressive PGR regime.

Cotton Variety Response to Different PGR Application Regimes

Results and Discussion

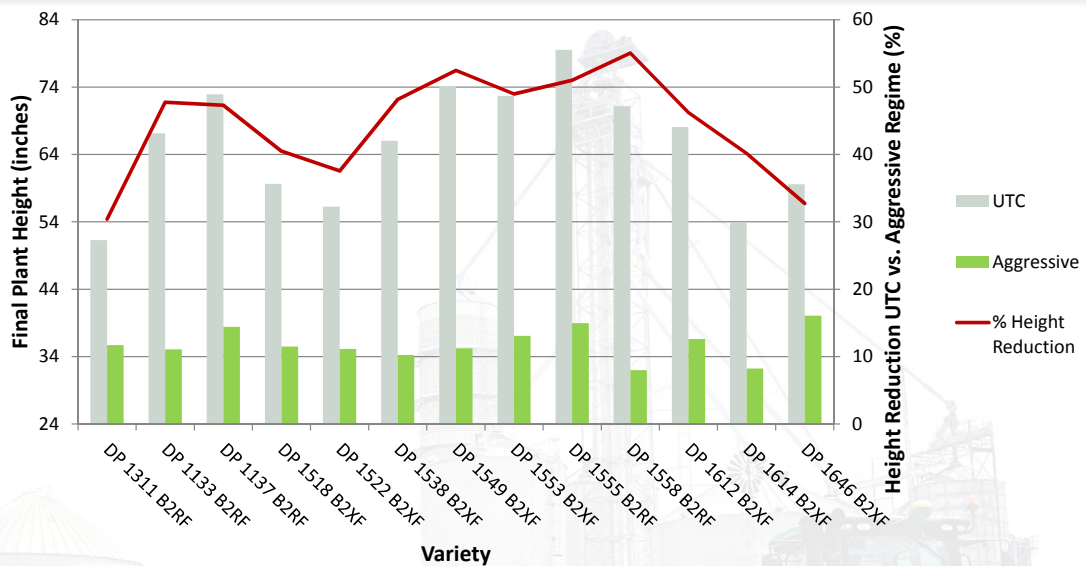


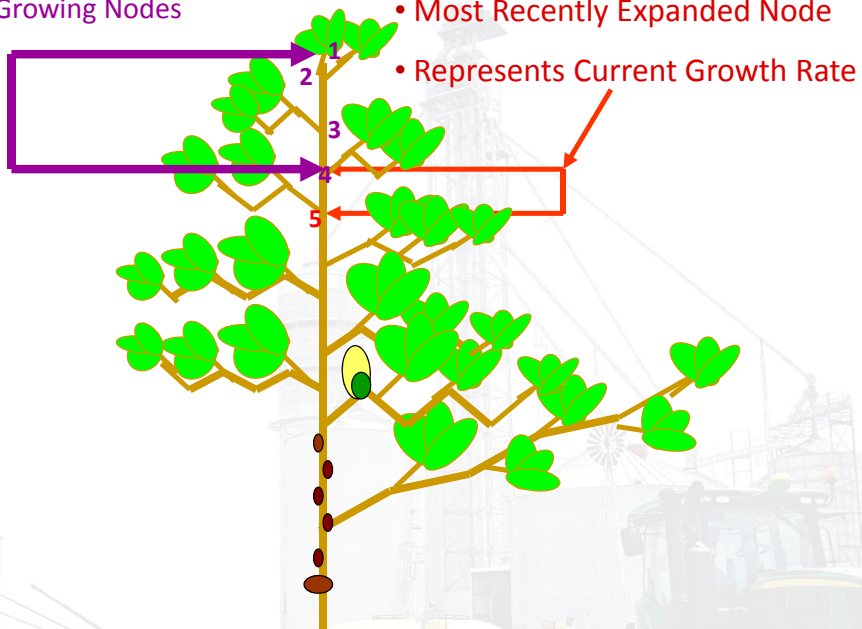
Figure 5. Final plant height of cotton by variety comparing untreated check and passive PGR regime.

Cotton Variety Response to Different PGR Application Regimes

Results and Discussion



Actively Growing Nodes



Cotton Variety Response to Different PGR Application Regimes

Results and Discussion



PGR Monitoring and Management

TL Size of a US Quarter count as 1 to node 4



Node between 4 and 5 from the top – “The one that bends”



Cotton Variety Response to Different PGR Application Regimes

Results and Discussion



Tools Estimating PGR Application Rates and Timing

- Understand the plant growth process
- Mepiquat chloride is:
 - Not degraded by the plant
 - Active at $\approx 10\text{ppm}$ dry wt.
- Response to mepiquat chloride over time
 - Rate
 - Timing
 - Plant size
 - Previous applications



Cotton Variety Response to Different PGR Application Regimes

Take Aways



- When managed properly, late-planted cotton often has excellent yield potential.
 - The highest yielding variety was DP 1518 B2XF under the passive PGR regime at 1600 lbs lint/acre.
 - Many cotton varieties yielded over 1500 lbs lint/acre when managed correctly.
- A wide response in yield was observed across the new cotton varieties.
 - Many of the cotton varieties yielded well even when no PGR was used.
 - Several of the varieties required PGR use in one regime or the other to maintain acceptable yield levels (i.e. DP 1555 B2RF and DP 1549 B2XF).

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Take Aways



- Several of the new Deltapine® cotton varieties show tremendous yield potential.
- Remember, height reduction is not yield.
 - Height is often the best measure of variety responses to PGR applications.
 - The final plant height in the UTC plots often gives an indication of the innate growth potential across a range of varieties.
- Excellent fruit retention helped to manage growth during this demonstration.
 - Varieties responded even better than expected to the passive treatments.
 - This also helps to make the case that particularly in late plantings, very aggressive insect control (Lygus/fleahopper) in combination with judicious PGR use can help establish acceptable yield potential.

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Legal Statements



The information discussed in this report is from a single site, non-replicated 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.

Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

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