



# The Response of Old and New Cotton Varieties to Plant Growth Regulators

## Study Guidelines

- A cotton demonstration trial was conducted at the Monsanto Learning Center at Scott, MS to investigate the effects of passive and aggressive plant growth regulator (PGR) management strategies on old and new cotton varieties.
- Fifteen Deltapine® cotton varieties were planted at 45,000 seeds per acre on May 30, 2013.
- All varieties except the two conventional varieties (Deltapine 20 and Deltapine 50) were Genuity® Bollgard II® with Roundup Ready® Flex cotton.
- Each variety received both the passive and the aggressive PGR treatments, which were compared to an untreated check.
- A primary goal of this trial was to learn about the growth habit and response to two levels of PGR applications on currently available cotton varieties as well as new cotton varieties that may be available to growers soon.
- Data were collected on plant growth reduction and yield.

PGR Applications (oz/acre)		
Date	Aggressive	Passive
2-July	12	NA
20-July	16	10
1-August	20	12

## Plant Monitoring and PGR Decision Making

Depending on the current growth rate of the field being managed, different decisions may be made about PGR management. The primary decision to be made by a manager is related to both rate and timing. By increasing the rate applied, or decreasing the interval between applications, a more aggressive management system can be instituted in the field. The most aggressive system would be increasing rate and decreasing the interval simultaneously. It is difficult to know when these modifications are necessary without a sound monitoring program.

The following are a few considerations for monitoring fields and making good decisions:

- Care should be taken to observe the growth patterns of all varieties.
- Monitoring is best accomplished via measurements of plant height and internode distance between the 4th and 5th nodes below the terminal node. This internode is easy to identify, either by counting down the plant or simply by bending the terminal. It will almost always be the internode that bends (Figure 1).
- The 4-5 internode length best indicates the actual plant growth rate. When considered in combination with the 2-3 internodes below it, this gives a good indication of plant growth rates and changes in growth rate over the last 2 weeks or so. If it's shorter, growth is decelerating.
- Use the plant size, internode length, and amount of PGR already applied to determine timing and rate for future PGR applications.



Figure 1. Monitoring the plant height and the internode distance between the 4th and 5th node below the terminal node to determine PGR application rate and timing.

## Factors in Making a PGR Decision

- PGRs are active at a dry weight concentration of approximately 10 ppm dry weight.
- Larger plants require more PGR to get over the threshold.
- PGR does not degrade. Once it is in the plant it stays there.
- PGR effect is diluted by growth.
- A PGR applied early is still useful later in the growing season.
- Low rates applied early can have benefits later in the season.



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## Results and Conclusions

- Proper use of plant growth regulators (PGRs) can be critical to help maximize yield potential.
- Mismanagement of PGRs can result in reduced yield potential.
- Understanding an individual variety's growth habit and response to growth management is one of the most important factors in developing a sound PGR management strategy.
- Plant response to PGRs varies by variety, plant genetics, and environmental conditions during and after application.
- Plant monitoring and PGR application are variety- and season-specific.
- The 2013 cotton season was exceptional, with extremely high yield potential.
- 5 of the 15 varieties reported higher yields with the passive PGR strategy.
- 5 of the 15 varieties reported higher yields with the aggressive PGR strategy.
- 5 of the 15 varieties reported higher yields in the untreated check.

- All varieties reported the tallest heights in the UTC plots.
- Certain varieties that were likely more determinate, with the fruit load helping to control vegetative growth, were not as responsive to PGR applications because height control was not needed.
- Less determinate varieties and varieties which typically have relatively aggressive early-season growth responded favorably to aggressive PGR applications (DP 1137 B2RF and DP 1252 B2RF).
- Aggressive PGR management of determinant varieties may reduce yield potential (Deltapine 20 and DP 1133 B2RF).
- Old Deltapine® cotton varieties (Deltapine 20 and Deltapine 50) yielded less than most of the newer cotton varieties, demonstrating the determinate nature of many older products vs. most of the newer varieties.
- This study provides a snapshot of responses in only one growth environment, location, and year, but may provide insight into the growth and development nature of the old and new Deltapine® cotton varieties.

Note: These results are not intended to provide you with a blueprint on how to grow any specific variety,

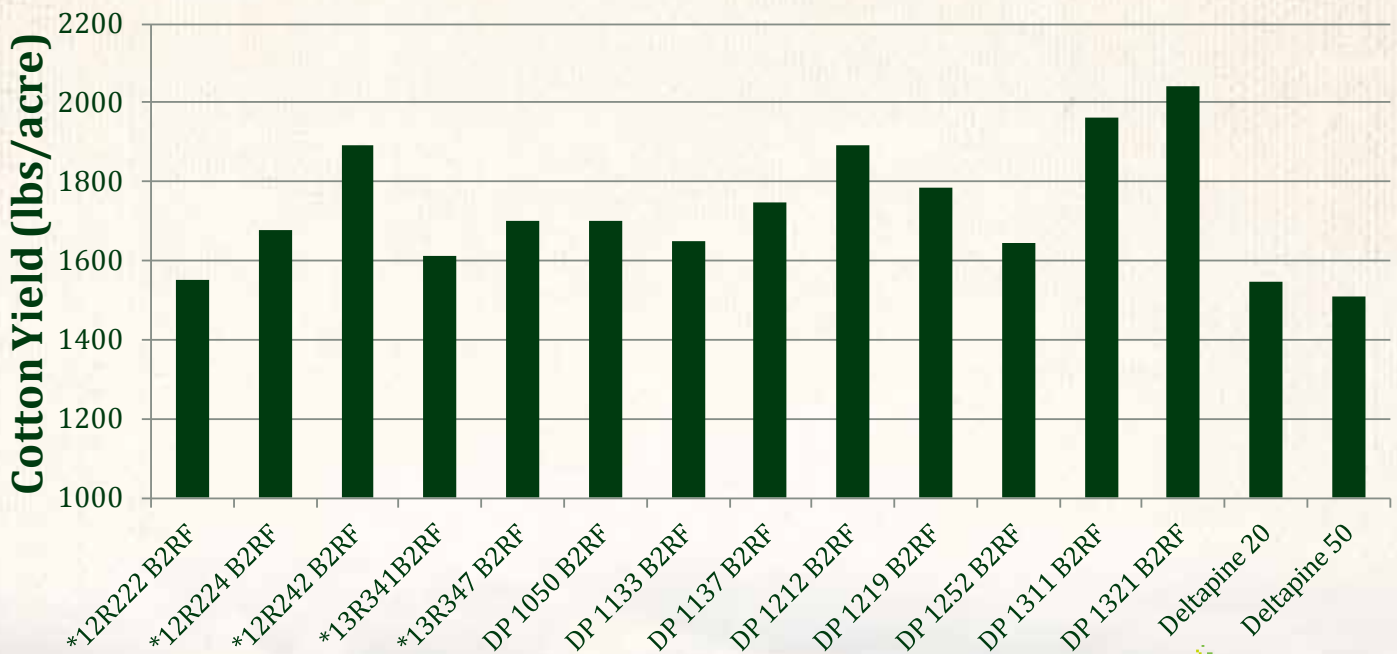


Figure 2. Cotton yield (lbs/acre) by variety across PGR regimes. \*Experimental variety - not commercially available.



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but merely provide observations from research in 2013. Your experience and knowledge will remain an invaluable component to the successful management of any variety. This information is being provided to aid decision making and advice regarding the management of these varieties. This information is not intended to replace your experience and knowledge regarding the proper management of your individual crops.

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

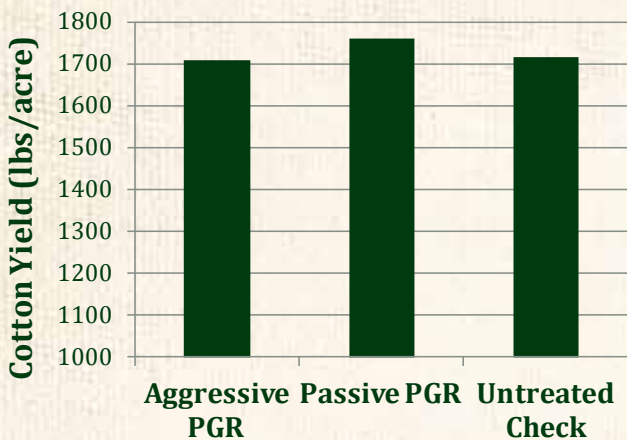


Figure 3. Cotton Yield (lbs/acre) across varieties by PGR regimes

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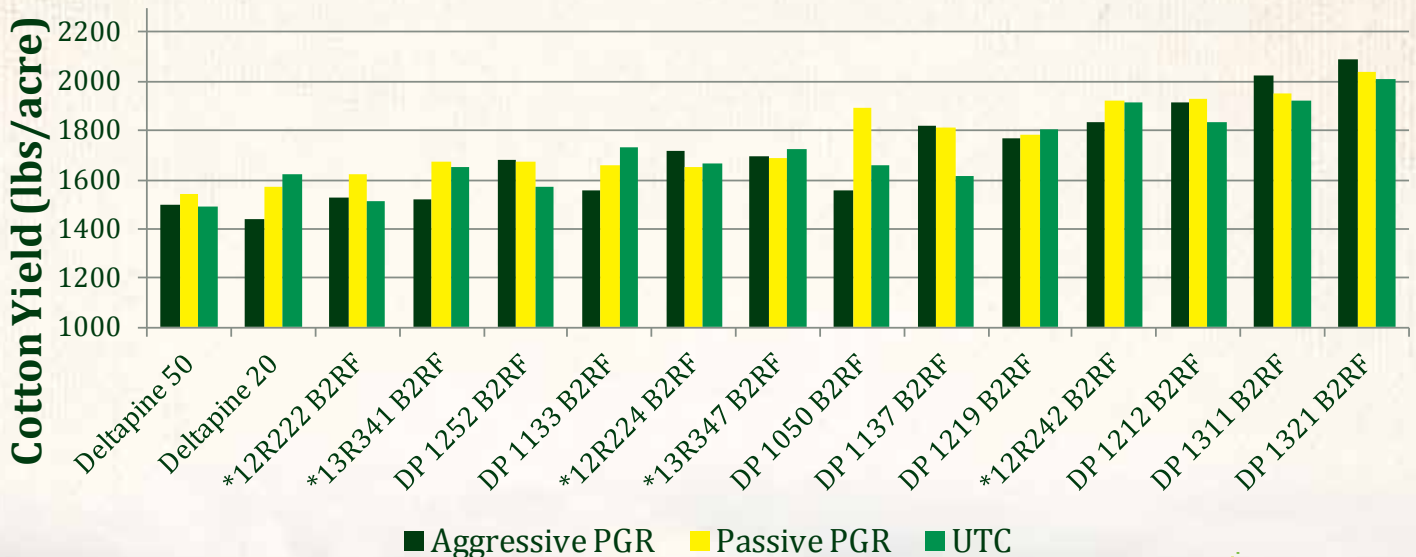


Figure 4. Cotton yield (lbs/acre) by PGR regimes by variety. \*Experimental variety - not commercially available.



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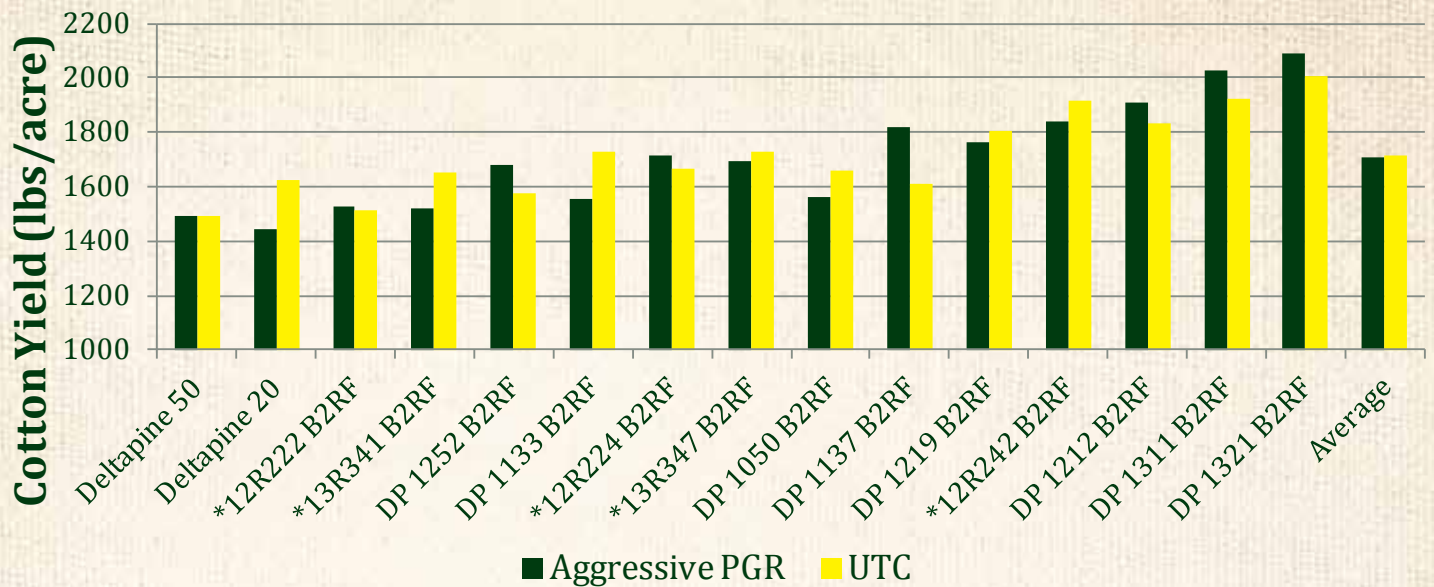


Figure 5. Cotton yield (lbs/acre) by variety with aggressive PGR regime. \*Experimental variety - not commercially available.

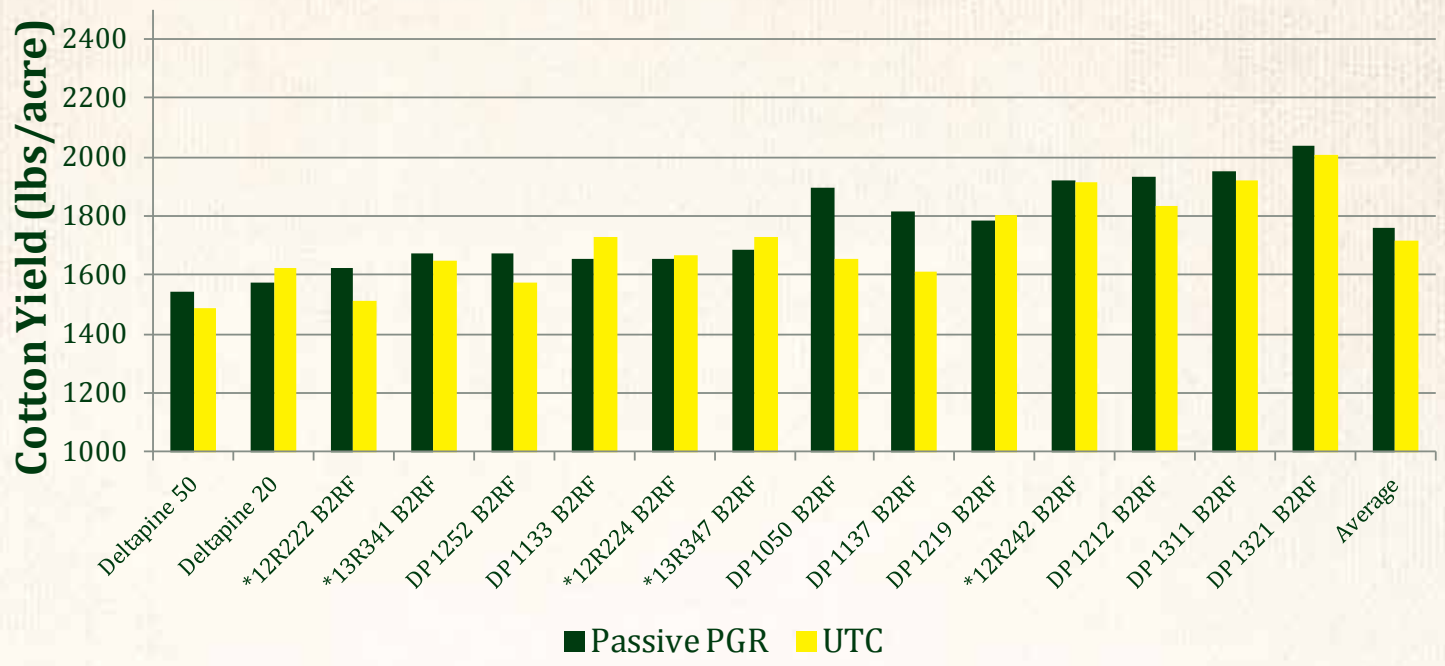


Figure 6. Cotton yield (lbs/acre) by variety with passive PGR regime. \*Experimental variety - not commercially available.



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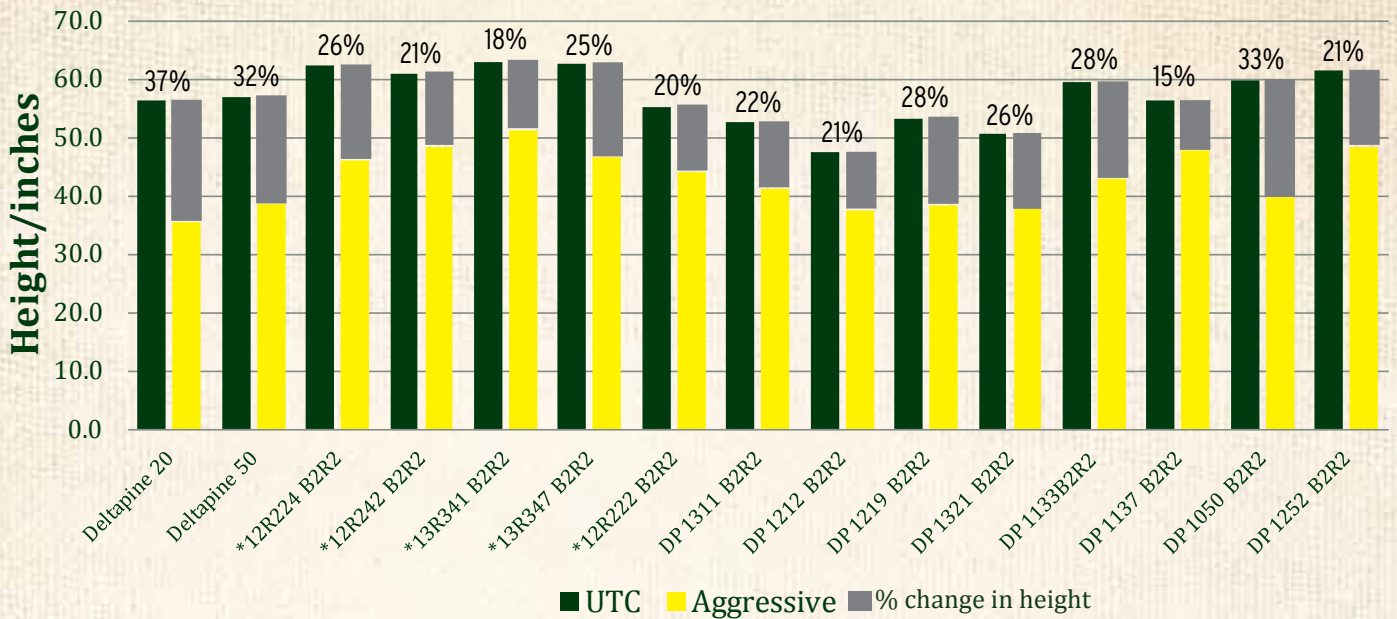


Figure 7. Percent height reduction from aggressive PGR regime on Deltapine® cotton varieties. \*Experimental variety - not commercially available.

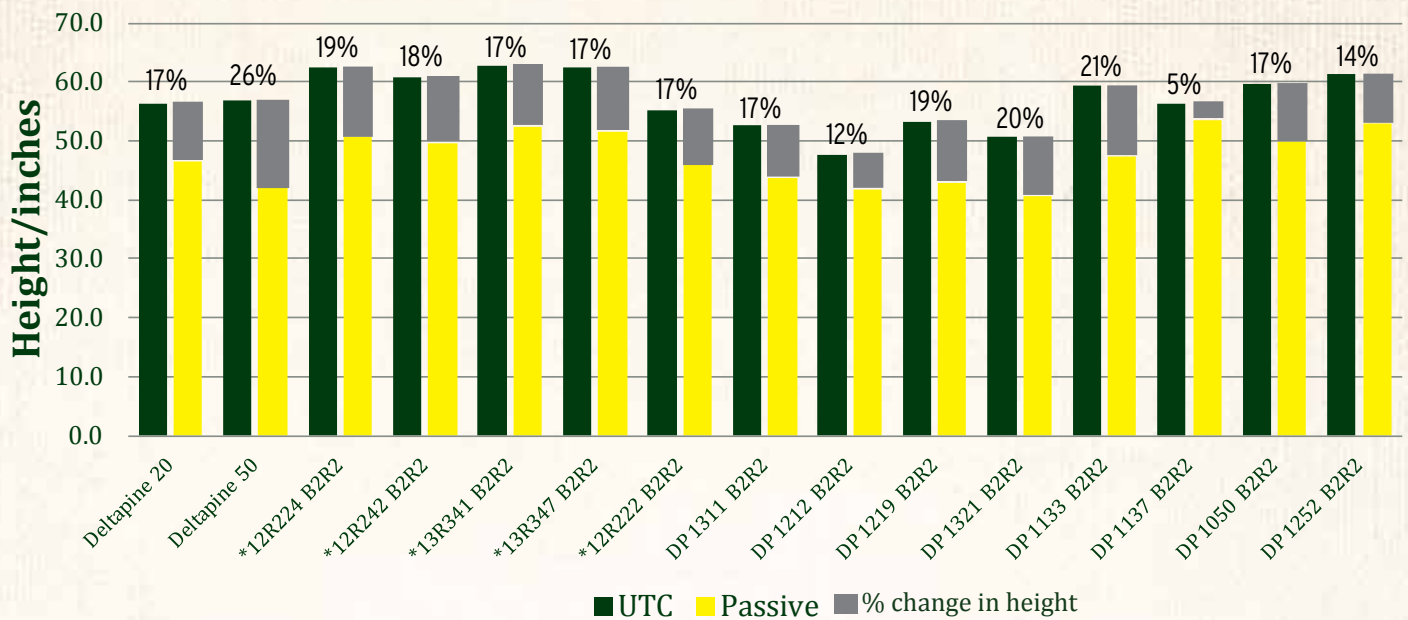


Figure 8. Percent height reduction from passive PGR regime on Deltapine® cotton varieties. \*Experimental variety - not commercially available.