

# EFFECT OF PLANT GROWTH REGULATOR STRATEGIES IN COTTON

A key factor in producing high-yielding cotton is managing the perennial and indeterminate growth habit of the cotton plant with plant growth regulators (PGRs). Proper use of PGRs, such as mepiquat chloride (Pix®), can be critical to help maximize yield potential in any given year, while the mismanagement of PGRs can result in reduced yield potential. When determining the proper application timing of PGRs, several factors such as soil type, soil fertility, irrigation, and field history should be considered.

Environmental factors can also influence PGR strategies and their effectiveness. However, understanding a particular variety's growth habit and response to a PGR application is one of the most important factors in developing sound PGR management strategies. Plant response to PGRs can vary depending on the cotton variety, plant genetics, and the environmental conditions during and after application. This makes blanket PGR recommendations difficult and often impractical.

## MATERIALS AND METHODS

In order to better understand the growth habits and response of the newer Deltapine® cotton varieties and older conventional varieties, a study was conducted at the Monsanto Learning Center at Scott, MS to investigate the effects of passive and aggressive PGR management strategies. Eleven cotton varieties were planted on May 1, 2012 (Table 1). Cotton varieties were planted in 12 row plots with 4 rows receiving the aggressive PGR management strategy, 4 rows receiving the passive PGR management strategy, and 4 rows left as an untreated check (UTC). The passive and aggressive treatments of a 4.2% mepiquat chloride are provided in Table 2. The passive treatment was designed to be optimal for less aggressively growing varieties and below optimal for more aggressively growing varieties. The plots were irrigated as needed and harvested with a commercial cotton picker. An application of Prevathon® insecticide was applied to conventional cotton varieties (DP 20 and DP 50). Seed cotton was ginned and weighed to determine lint yield per acre and plant heights were taken from the aggressive PGR and UTC plots.

## RESULTS

Not all varieties respond similarly to PGR applications, so measuring and comparing actual growth can help indicate the agronomic status of a field. Traditionally, producers learn PGR management strategies during the first few years after variety introduction. This demonstration is an attempt to help learn and apply specific management strategies earlier in the life cycle of the cotton product and to compare PGR response of new varieties to old conventional varieties.

**Deltapine® Cotton Varieties**

Class of 09	Class of 10	Class of 12
DP 0912 B2RF	DP 1048 B2RF DP 1044 B2RF	DP 1252 B2RF DP 1219 B2RF DP 1212 B2RF
Class of 13	Conventional	
DP 1311 B2RF DP 1321 B2RF DP 1359 B2RF	DP 20 DP 50	

Table 1. Deltapine cotton varieties in PGR management strategy demonstration.

**PGR Management Strategies  
(4.2% mepiquat chloride)**

PGR Strategy	Timing	Date	Rate
Passive	12 nodes	June 22	10.4 oz/acre
	15 nodes	July 6	14.2 oz/acre
	20 nodes	July 23	12 oz/acre
Aggressive	8 nodes	June 22	12 oz/acre
	12 nodes	June 28	16 oz/acre
	20 nodes	July 6	20 oz/acre

Table 2. Timing, date, and rate of the passive and aggressive PGR management strategies.

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Deltapine® cotton varieties differed in response to PGR management strategies (Figure 1). A passive PGR strategy resulted in a higher final yield for seven of the eleven selected varieties, while four cotton varieties produced higher yields with the more aggressive PGR management strategy. The largest yield difference when comparing the same variety across the two PGR regimes was 228 lbs lint/acre for DP 1321 B2RF, which yielded more under the passive PGR strategy. The largest difference in favor of the aggressive PGR strategy was 99 lbs lint/acre for DP 1212 B2RF. For all data collected in this trial it is important to remember this is an unreplicated demonstration.

The different PGR management strategies also affected the height of cotton plants at harvest. All cotton varieties reported the tallest plants in the untreated check (UTC) (Figure 2). Results from this evaluation show that some varieties are more responsive than others to PGR applications. Certain varieties were not as responsive to PGR applications because height control was not needed, these varieties were likely more determinate with the fruit load helping to control vegetative growth of the plant.

## CONCLUSIONS

As expected, not all cotton varieties responded the same to PGR applications. Both less determinate varieties and varieties which typically have relatively aggressive early-season growth responded favorably to aggressive PGR applications (DP 1252 B2RF, DP 1048 B2RF, and DP 1212 B2RF).

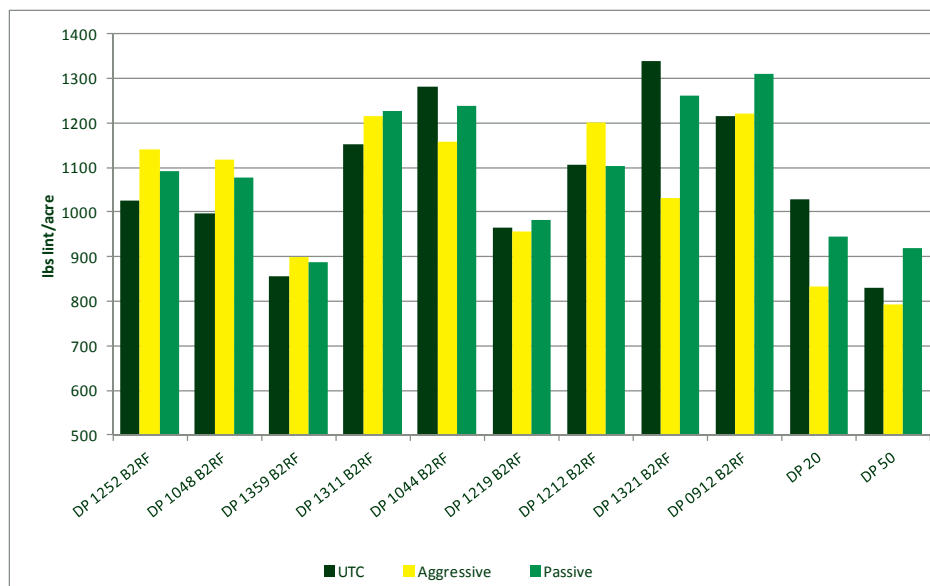


Figure 1. Effect of PGR strategies on yield (lbs lint/acre) of Deltapine® cotton varieties. UTC = untreated check

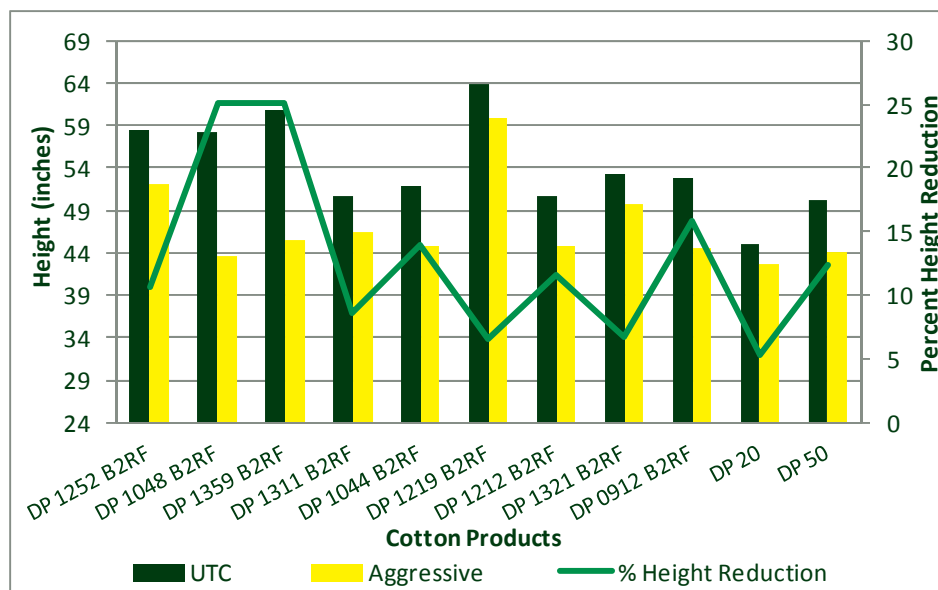


Figure 2. Effect of PGR strategies on harvest height (inches) and percent of height reduction of Deltapine® cotton varieties. UTC = untreated check



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When more determinate varieties are planted, yield may be reduced with a more aggressive PGR management strategy as observed in DP 1321 B2RF and DP 1044 B2RF.

When evaluating PGR response of the old Deltapine® cotton varieties, DP 20 and DP 50 were responsive to PGR applications resulting in lower yields for all PGR regimes except the passive management of DP 50. When comparing the height of the older cotton varieties to newer cotton varieties, DP 20 and DP 50 were shorter than all but one new variety in the untreated check, suggesting that the older varieties may not have needed the aggressive PGR management of newer varieties on the market. DP 20 and DP 50 also yielded less than most of the newer cotton varieties which demonstrates progress that has been made to the increase yield potential of cotton varieties in the past 25 years.

Care should be taken to observe all varieties with respect to their growth patterns. When making PGR application decisions for any cotton variety, remember to look at the node elongation of node

4-5 from the top of the plant, soil moisture, agronomic practices and weather patterns. This study gives a snapshot of responses in only one growth environment, location and year, but may provide insight into recommendations of what to look for in growth and development of the Deltapine® Class of 09, 10, 11, 12, and 13 cotton varieties.

Note: These results are not intended to provide you with a blueprint on how to grow any specific variety but merely provide some research with them. 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. The information is not intended to replace your experience and knowledge regarding the proper management of your individual crops.

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