

AGRONOMIC

Spotlight



Technology
Development
by MONSANTO

Deltapine® Brand Class of '09 and Class of '10 Cotton Growth Management

The use of plant growth regulators (PGRs) is an important tool to help manage cotton growth in high-yielding environments. Proper use of PGRs in cotton can help balance vegetative and reproductive growth, in turn controlling plant maturity, improve square and boll retention and controlling plant height to improve harvest efficiency. Determining the optimum PGR use rate and application timing is difficult and can vary depending on many factors, including the soil texture, weather conditions, fertility, etc. However, understanding a cotton variety's growth habit and response to PGRs is one of the most important factors in developing a growth management strategy.

Cotton farmers who have planted DP 555 BGR for many years learned to take an aggressive PGR approach to control the strong vegetative growth habits of the variety. New cotton varieties in the Deltapine® brand Class of '09 and Class of '10 vary in response to PGR applications; however, overall a less aggressive approach will be needed to control vegetative growth when compared to DP 555 BGR.

Use of Mepiquat-based PGRs in Cotton

Mepiquat-chloride, first sold as Pix® brand, was the first growth regulator successfully used in cotton to make a significant impact on managing plant growth and yield. Mepiquat is an anti-gibberellin growth retardant that works to reduce plant cell enlargement and is used to help balance vegetative and reproductive growth. When applied to cotton it can reduce stem elongation at newly formed internodes and can help with fruit retention. It may also be used to help make cotton mature earlier, reducing the crop's risk of late-season insect damage and boll rots, and can also keep rank growth in check to minimize harvest losses. Mepiquat applications have been linked to increased cotton yield potential when applied at the optimum rate and timing specific to a variety and field conditions.

Class of '09 and Class of '10 Cotton Growth Management

It is important to understand the growth habit of a particular variety in order to manage vegetative growth. Certain varieties, such as DP 555 BGR, maintain a much more aggressive growth pattern when compared to other varieties and mepiquat rates and timing must be managed accordingly. In research trials, when compared to other cotton varieties DP 555 BGR maintained similar plant growth

Deltapine® Brand Class of '09 and Class of '10 Cotton Varieties

Very Responsive	Responsive	Moderately Responsive	Least Responsive
DP 0920 B2RF	DP 0912 B2RF	DP 0949 B2RF	DP 1050 B2RF
	DP 0924 B2RF	DP 1048 B2RF	
	DP 1028 B2RF	DP 0935 B2RF	
	DP 1034 B2RF		
B2RF = Genuity® Bollgard II® with Roundup Ready® Flex Cotton			
Table 1. Deltapine® brand Class of '09 and Class of '10 variety response to growth management with mepiquat.			

prior to square development, but by bloom stage the variety exhibited a much stronger growth pattern. When compared to other cotton varieties in trials, DP 555 BGR had taller plant height, more main stem nodes, and more total fruiting nodes. Farmers who have raised DP 555 BGR have learned to control this variety's aggressive growth with higher rates and consecutive applications of

mepiquat. It is important to apply mepiquat according to a variety's current growth and not by what types of applications were made in the past.

The new Deltapine® brand Class of '09 and Class of '10 cotton varieties may each respond a little differently to the application of mepiquat. The projected response of each variety is provided in Table 1. DP 0920 B2RF has shown the most response to mepiquat, meaning lower rates or fewer applications may be needed. DP 1050 B2RF has shown the least response to mepiquat, meaning timely early-season applications at higher rates or more application may be needed to control vegetative growth (growth similar to DP 555 BGR).

Mismanagement of mepiquat or other PGRs can have a negative effect on yield, especially when applied too early, when applied to stressed cotton, or when applied to a determinant cotton variety.

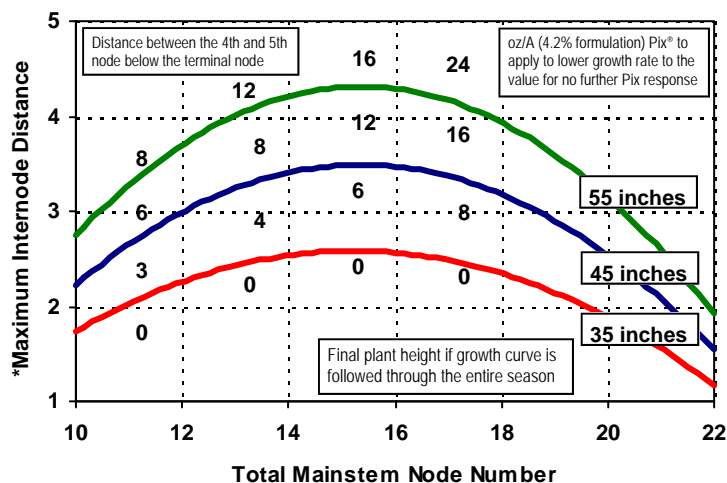
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When deciding to apply an application of mepiquat, the actively-growing top five internodes of the cotton plant should be evaluated. Mepiquat chloride rate and timing sticks are available to provide recommendations according to the average internode length of the top five nodes of the plant. Another way to determine application rate is to monitor the height and internode distance between the 4th and 5th node below the terminal node. Figure 1 provides mepiquat application rate recommendations based on the internode distance between the 4th and 5th node and the total mainstem node number. The longer the internode length, the higher the recommended rate. Other plant measurements and field conditions can also help assess if cotton plant growth need control measures. Table 2 provides suggestions for growth control measures.

Mepiquat and other PGRs should be considered management tools used to maintain ideal cotton height and fruiting zone. In-season monitoring of cotton plants provides the best information to determine application rate and timing of growth control measures. It is important to remember that every cotton field is under different conditions so growth management strategies should be tailored to each field situation.

Recommended Mepiquat Use Rate*



*4.2% formulation of mepiquat chloride

Figure 1. Recommended mepiquat rate according to total mainstem node number and maximum internode distance between the 4th and 5th node below the terminal node.

Measurement at first flower	Growth Control Measures Indicated	Growth Control Measures Not Indicated
Height (@ 1st bloom)	Greater than 28"	Less than 24"
Growth Rate per day	Greater than 1"	Less than 0.7"
Mainstem Node Growth Rate	Less than 3 days per node	Greater than 3 days per node
Maximum Internode Distance	Greater than 3" per node	Less than 2" per node
Vegetative Nodes	Greater than 7.0	Less than 5.5
Bottom Five Retention	Less than 60%	Greater than 90%
Top Five Retention	Less than 80%	-
NAWF @ 1st Bloom	Greater than 8.5	Less than 7
Weather	Cloudy/Rain	Sunny/Warm
Water Relations	Excessive	Droughty

Table 2. Recommendations to help determine if growth control measures are needed at first flower stage according to cotton growth measurements and field conditions.

Sources: 2008 Research Summary: Effect of PGR Strategies on Yield of New Cotton Varieties. The Learning Center in Leland, MS.

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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.

Growers may utilize the natural refuge option for varieties containing the Bollgard II® trait in the following states: AL, AR, FL, GA, KS, KY, LA, MD, MS, MO, NC, OK, SC, TN, VA, and most of Texas (excluding the Texas counties of Brewster, Crane, Crockett, Culberson, El Paso, Hudspeth, Jeff Davis, Loving, Pecos, Presidio, Reeves, Terrell, Val Verde, Ward and Winkler). The natural refuge option does not apply to Bollgard II cotton grown in areas where pink bollworm is a pest, including CA, AZ, NM, and the above listed Texas counties. It also remains the case that Bollgard® and Bollgard II cotton cannot be planted south of Highway 60 in Florida, and that Bollgard cotton cannot be planted in certain other counties in the Texas panhandle. Refer to the Technology Use Guide and IRM/Grower Guide for additional information regarding Bollgard II, Bollgard, natural refuge and EPA-mandated geographical restrictions on the planting of Bt cotton. **ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.** Roundup Ready® crops contain genes that confer tolerance to glyphosate, the active ingredient in Roundup® brand agricultural herbicides. Roundup® brand agricultural herbicides will kill crops that are not tolerant to glyphosate. Bollgard II®, Genuity®, Genuity and Design®, Genuity Icons, Respect the Refuge and Cotton Design®, Roundup®, Roundup Ready®, and Technology Development by Monsanto and Design(SM) are trademarks of Monsanto Technology LLC. Deltapine® is a registered trademark of D&P Technology Holding Company, LLC. All other trademarks are the property of their respective owners. ©2010 Monsanto Company. 05112010CRB



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