



PLANT GROWTH REGULATOR USE IN OKLAHOMA COTTON

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Mepiquat-based (such as Pix Plus, Mepex, Mepichlor, Mepiquat Chloride, Mepex GinOut, Stance, and others) plant growth regulators (PGRs) have been available for many years. Companies are constantly enhancing formulations, but the main active ingredient in nearly all of these products is mepiquat chloride.

Mepiquat chloride (MC) reduces production of gibberellic acid in plant cells that in turn reduces cell expansion, ultimately resulting in shorter internode length. MC will not help the plants compensate for earlier weather or disease damage. It does not increase growth rate but essentially reduces plant size by reducing cellular expansion. It may, under good growing conditions, increase fruit retention, control growth and promote earliness. **MC should not be applied if crop is under any stresses including moisture; weather; severe spider mite, insect, or nematode damage; disease stress; herbicide injury including herbicide damage (for example 2,4-D, dicamba, etc.) due to drift or from tank contamination; or fertility stress.**

Results from replicated testing indicates that a 5 to 20% reduction in plant height (compared to the control) can be obtained from 16 oz of 4.2% a.i. MC material applied in up to 4 sequential 4-oz/acre applications starting at match head square (MHS) and ending at early bloom. It is generally possible to reduce about one node from the growth of the main stem, which can result in about 3-5 days earlier cutout. **Low rate multiple applications beginning at MHS have generally provided more growth control than later higher rate applications made at first bloom or later.** Research trials have shown that statistically significant increases in yields are not generally obtained, but excellent growth control is consistently provided. Many times we don't see a lot of differences in performance of these products with respect to growth control.

Available Products

Mepiquat based products have been around for many years. Several PGRs based on the same active ingredient are now available. Refer to the product labels or contact Extension personnel or company representatives or to ensure you understand the correct use of these products.

Mepex, Mepichlor, Mepiquat Chloride and other generics
4.2% active ingredient (a.i.)/gallon or 0.35 lb/gallon a.i.

Mepex Gin Out

4.2% a.i./gallon or 0.35 lb/gallon a.i. with 0.0025% Kinetin (a cytokinin).

Cytokinins are plant hormones that promote cell division and growth and delay the senescence of leaves. This product has use guidelines similar to other MC materials.

Pentia

Has a different molecular structure than MC.

9.6% a.i./gallon or 0.82 lb/gallon a.i. Typically Pentia has similar use rates when compared to 4.2% MC products.

Stance

Bayer CropScience's Stance product is an MC based PGR. It is a 4 to 1 ratio of MC and cyclanilide (0.736 lbs/gallon MC plus 0.184 lbs/gallon cyclanilide). Cyclanilide is an auxin synthesis and transport inhibitor. Auxins are compounds which have the capacity to induce cell elongation. The inhibition of auxins could reduce cell elongation and inhibit growth. **Producers should be aware that the mepiquat chloride concentration in Stance is about twice as high as most of the other materials we have become accustomed to applying, THEREFORE, THERE IS A CORRESPONDING REDUCED USE RATE.**

What to Expect From Application

Consistent yield increases have not been observed from any of the MC materials we have investigated. A good boll load will normally help control plant growth. Fields with poor early-season fruit retention, excellent soil moisture, and high nitrogen fertility status may be candidates for poor vegetative/fruitlet balance and should be watched carefully. Growers who have planted varieties with vigorous growth potential and have fields with excellent growing conditions may need to consider PGR application. For brush roll header stripper harvest, 28-32 inch tall plants optimize stripper-harvesting efficiency. If possible, target a maximum plant size of about 32 inches for varieties under high input irrigation (sub-surface drip or high capacity pivots). If plants get larger than 36 inches, harvest efficiency and productivity drop significantly. For spindle picker harvesters, larger plant size for high yielding cotton is not as much of a harvesting consideration. **Pickers can handle higher yielding, taller plants with much greater ease than stripper harvesters, especially when the stalks are still alive (or "green"). However, if weather constraints at harvest time delay harvesting after freezing weather, the large brittle plants can result in picker harvesting difficulties.**

Application Rates and Production Environment

Determination of application rates is generally more "art" than "science" for these products. Applications should begin when 50% of the plants have one or more matchhead squares (see specific product label for more information). It is best to manage high growth potential early if conditions favor excessive growth for an extended period of time. Herein lies an important dilemma: It is unknown at that time as to how weather will affect the crop in July and into August. If 100+ degree temperatures with

southwest winds at 30 mph and 10% relative humidity are encountered, those conditions will limit plant growth in many fields with low irrigation capacity. Watch high growth potential varieties and fruit retention. If a high growth potential variety has been planted and has low fruit retention, then MC rate should begin early and be increased, especially under high water, fertility, and good growth conditions. One should target applications to fields with high growth potential. Some newer varieties may need aggressive management under high irrigation capacity and/or if heavy rainfall conditions are encountered. The situation that has arisen due to the release and availability of new genetics is challenging. Visit with your seed company representative to determine which new varieties should be watched closely for MC needs under field-specific conditions. Use MC to limit plant size. Sequential applications can be adjusted to meet subsequent crop conditions and growth potential.

2016 Cotton Varietal Growth Habit Descriptions Based on Company Literature

Company/Variety	Growth Habit Description	Potential Growth Aggressiveness*
Dow Agrosiences PhytoGen		
PHY 222 WRF	Short	likely minimal PGR requirement
PHY 312 WRF	Medium	moderate PGR requirement
PHY 333 WRF	Medium-Tall	needs PGR management early
PHY 339 WRF	Tall	needs PGR management early
PHY 444 WRF	Medium	moderate PGR requirement
PHY 495 W3RF	Tall	aggressive - needs PGR management early
PHY 499 WRF	Tall	aggressive - needs PGR management early
Deltapine		
DP 0912 B2RF	Medium	needs PGR management
DP 1044 B2RF	Medium-Tall	needs PGR management, but more responsive to PGR
DP 1219 B2RF	Tall	aggressive - needs PGR management early (5-7 oz MHS, more 10 days later, more 10 days later)
DP 1321 B2RF	Medium-Tall	needs PGR management, but more responsive to PGR
DP 1359 B2RF	Tall	aggressive - needs PGR management early (5-7 oz MHS, more 10 days later, more 10 days later)
DP 1518 B2XF	Medium	needs PGR management
DP 1522 B2XF	Medium-Tall	needs PGR management
DP 1549 B2XF	Tall	aggressive - needs PGR management early, but more responsive to PGR
DP 1612 B2XF	Medium-Tall	needs PGR management
DP 1614 B2XF	Medium	needs PGR management
DP 1639 B2XF	Medium-Tall	aggressive - needs PGR management early (5-7 oz MHS, more 10 days later, more 10 days later)
DP 1646 B2XF	Medium-Tall	aggressive - needs PGR management early (5-7 oz MHS, more 10 days later, more 10 days later)
NexGen		
NG 1511 B2RF	Medium-Tall	aggressive - needs PGR management early
NG 3406 B2XF	Medium	moderate PGR requirement
NG 3500 XF	Medium-Tall	moderate PGR requirement
NG 3517 B2XF	Medium-Tall	moderate PGR requirement
NG 4545 B2XF	Tall	aggressive - needs PGR management early
NG 5007 B2XF	Tall	aggressive - needs PGR management early
Bayer CropScience		
FiberMax		
FM 1911 GLT	Short/Compact	needs PGR management early
FM 1830 GLT	Medium/Moderate	moderate PGR requirement
FM 2334 GLT	Medium/Moderate	moderate PGR requirement
FM 2007 GLT	Medium/Moderate	moderate PGR requirement
Stoneville		
ST 4848 GLT	Medium/Moderate	aggressive - needs PGR management early
ST 4949 GLT	Medium/Moderate	aggressive - needs PGR management early
ST 4747 GLB2	Medium/Moderate	aggressive - needs PGR management early
ST 4946 GLB2	Medium/Moderate	moderate PGR requirement

*Aggressiveness is subjective and may change based on local conditions. Low early season fruit retention and high N fertility coupled with high moisture availability will usually result in larger plants.



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SUGGESTIONS FOR GROWTH REGULATORS IN OKLAHOMA COTTON

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Trade Name	Active Ingredients Similar Products	Suggested Rates Per Acre	Water Volume Recommended		COMMENTS
			GROUND	AIR	
GROWTH REGULATORS					
Pix Ultra 0.35 lb ai per gallon	Mepiquat Chloride Pix Mepex Mepichlor and other similar products	2-24 fl oz	≥2	≥2	<p>Option of single or multiple applications. Low rate multiple applications typically provide the best growth control.</p> <p>a) Low rate multiple applications initiated when 50% of plants have one or more matchhead (1/8 to 1/4 inch diameter) squares provide producers the option of discontinuing applications if stresses occur. Sequential applications can be made 7-14 days later if needed.</p> <p>b) Apply at higher rates when plants are in early bloom stage. Apply to actively growing cotton that is 20-30" tall, provided cotton is not more than 7 days beyond early bloom stage (5-6 blooms per 25 row feet). Sequential applications may be made 14-21 days after initial treatment if vigorous growth continues.</p> <p>If drought stress occurs after mepiquat chloride is applied, or after a full rate (0.5 to 1 pt) is applied, results won't be optimal.</p> <p>Mepiquat chloride should not be applied if plants are currently under severe stress from weather factors, mite, insect or nematode damage, disease, herbicide injury or fertility.</p>
Mepex Gin Out 0.35 lb ai per gallon mepiquat chloride	Mepiquat Chloride + Kinetin	2-16 fl oz	≥2	≥2	See Pix Ultra Comments above.
Pentia 0.82 lb ai per gallon	Mepiquat Pentaborate	4-24 fl oz/A	≥10	≥2	See Pix Ultra Comments above.
Stance 0.736 lb ai per gallon + 0.184 lb ai per gallon	Mepiquat Chloride + Cyclanilide	2-4 fl oz/A	≥10	≥2	<p>Mepiquat chloride concentration is about twice as high as other products. THEREFORE THERE IS A CORRESPONDING REDUCED RATE. First application should be made when 50% of the cotton plants have one or more matchhead squares. (1/8 to 1/4 inch in diameter). Begin sequential applications 7-14 days later or when regrowth occurs. Allow a minimum of 7 days between applications.</p> <p>Use rates of 2.0 to 4.0 fl. oz. per acre are based on field examination and the degree of vegetative vigor. For moderate vegetative vigor use 2.0 fl. oz. per acre and for high vegetative vigor (growthy varieties, high nitrogen fertility, and excellent soil moisture conditions) use 3.0 to 4.0 fl. oz per acre.</p> <p>Stance should not be applied if plants are currently under severe stress from weather factors, mite, insect or nematode damage, disease, herbicide injury or fertility.</p>