COTTON AGRONOMY

TIMELY INFORMATION SERIES

Plant Growth Regulator (PGR) Management Under High Rainfall Conditions

The 2017 growing season is thus far a decidedly wet one. Rainfall throughout the state was a welcome change from the previous dry spell, but excessive amounts have delayed cotton plantings or caused isolated replants. For cotton that is established and approaching squaring, the next critical management activity is application of PGRs.

Heavy rainfall years will require a change in PGR strategies, especially for dryland producers. No matter the strategy though, it is critical to get the first application out early – prior to 1st bloom or even early if excessive growth is present. This is crucial to managing growth later in the season. Growers cannot rely on late season applications alone. A lone high rate application late in the growing season may achieve early cutout, but will have missed the objective of early season boll retention and growth reduction.

There are several misconceptions of what PGR accomplish in the cotton plant. They do not: stimulate Flowering, boll production, or have any significant effect themselves on yield. The do: Improve boll retention especially in the lower canopy, manage excess canopy growth and there by allows better pesticide penetration, can reduce boll rot incidence, and reduce lodging. It is all of these things combined that contribute to the likelihood of increased yields.

The name of the game is <u>Boll Retention</u>, especially early in the lower canopy. Retaining first position bolls boosts yield potential substantially. High square loss (25% or greater) trigger the plant to compensate with increased node production, greatly adding to excess vegetative growth. This growth is hard to control later in the season. In larger plants, it is difficult to get a high enough PGR concentration to have the desired effect of reducing growth. Early season PGR applications are extremely critical in wet years. The challenge is compounded by fewer chances to get the sprayer in the field. Therefore, it is imperative for growers to track and understand their cotton growth so timely applications are made. Below are some tips on monitoring cotton and strategies to consider.

COTTON MORPHOLOGY

Growth Stage	Days	Heat Units – DD60s
Planting to Emergence	**4 to 9**	**50 to 60**
Emergence to First Square	**27 to 38**	**425 to 475**
Square to 1st Flower	**20 to 25**	**300 to 350**
Planting to 1st Flower	**60 to 70**	**775 to 850**

	Height to Node Ratio (inches/node)		
Growth Stage	**Normal**	**Stressed**	**Vegetative**
Seedling	0.5-0.75	–	–
Early Squaring	0.75-1.2	**0.7**	>1.3
Large Square – First Flower	1.2-1.7	<1.2	>1.9
Early Bloom	1.7-2.0	<1.6	>2.5
Early Bloom + 2 weeks	2.0-2.2	<1.8	>2
			Jost et al. 2005

$$DD60 = \left(\frac{Max\ temp + Min\ temp}{2}\right) - 60$$

Knowing the DD60 accumulation in a given field is important to effective plant growth monitoring. The table above gives a basic summary of DD60's required to reach flowing stage in cotton. During these critical stages measuring Height to Node Ratio (HNR), which is total plant height dived by the number of nodes present, can give a grower a good clue as to the type of growth the crop is having. If measurements are in the vegetative range, an aggressive PGR strategy would be advisable. Below are some recommendations on application strategies based on a moderate vs aggressive approach:

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	RATE PER ACRE (oz)	
MODERATE APPLICATION/RATE	**Mepiquat**	**Stance**
First Application: Apply when cotton is between 20-30 in. tall. If cotton is 24 in tall and has no blooms apply Mepiquat chloride plant regulator. Use 16 oz per acre in areas tending to have excessive vegetative growth.	8.0-16.0	2.0-3.0
Second Application: Excessive growth, and/or conditions after the first application are favorable for excessive growth. Apply a second application 2 to 3 weeks after the first application.	8.0-16.0	3.0
AGGRESSIVE MULTIPLE LOW-RATE APPLICATIONS	**Mepiquat**	**Stance**
First Application: Match head square stage of growth.	2.0-4.0	2.0
Second Application: 14 days later, or when excessive re-growth occurs.	2.0-4.0	2.0
Third Application: 14 days later, or when excessive re-growth occurs.	4.0-8.0	2.0
Fourth Application: 14 days later, or when excessive re-growth occurs.	4.0-8.0	3.0
		Main et al. 2012

For some basic take home points, PGR Application is Justified When…

- **Height: Cotton plant is 25-30 inches tall or greater during the 1st week of bloom.**

- **Nodes Above White Flower (NAWF): Plant has greater than 9-10 nodes above first white flower during 1st week of bloom, and optimum growing conditions look to continue.**

- **Square/Fruit Retention: Square retention is low (50-75% or less) at first bloom and soil moisture is high.**

- **Internode Distance: Is 3-5 inches between 4th and 5th node from terminal.**

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