

THE EFFECTS OF MEPIQUAT CHLORIDE APPLIED TO COTTON AT PHYSIOLOGICAL MATURITY**Bill Foote****Guy Collins****Keith Edmisten****James Lanier****Ranjit Riar****Seth Holt****North Carolina State University****Raleigh, NC****Joel Faircloth****Dow Agrosiences****Collierville, TN****Gail White****David Horton****TAREC****Suffolk, VA****Abstract**

Mepiquat chloride (MC) has been used extensively in North Carolina to inhibit excessive vegetative growth. This is particularly important in North Carolina where a vast majority of the cotton production is non-irrigated and the presence or absence of rainfall determines the length of the growing season and the plant's ability to produce and mature bolls. MC has proven to effectively reduce plant height, improve insect management, decrease boll rot, and potentially enhance yield. MC has been traditionally applied immediately before and/or at early bloom if the growing conditions favor rank growth; such as, cotton planted after May 15, high plant populations (greater than 4 plant per foot), and high nitrogen rates, fields with a history of rank growth, large indeterminate varieties, and fields with delayed maturity (Edmisten, 2008). Recently, it has been suggested that late season applications of MC at physiological maturity may further enhance crop maturity, reduce re-growth potential, and promote higher yields. Weir et al. (1997) conducted a three-year study on Acala cotton in the San Joaquin Valley, California to determine the effects of late season applications of MC. They found no significant yield increase due to late season applications of MC, but they did report some other benefits to these applications. These benefits included: reduced trash in seed cotton due to reduction in tall plants above the canopy, more even and complete maturation, improved quality due to the need for a single harvest, reduction in the number of defoliant applications, and increased maturity and incidence of opened bolls at higher node positions on the plant. Munk et al. (1998) conducted a four-year experiment in the San Joaquin Valley, California to determine the response of Pima cotton (*Gossypium barbadense*) to late season applications of MC. They reported no significant yield increases and inconsistent plant growth responses to late season applications. They concluded that responses to sequential applications of MC at mid-bloom and late-bloom showed potential for yield increase in Pima cotton. The objective of this experiment was to investigate the effects of MC applied at physiological maturity (cutout) in the mid-south, and to determine if early bloom MC applications have any effect on the response of cutout applications.

Experiments were conducted in 2007 and 2008 at an on-farm location in Duplin County, NC. This site was chosen for its' potential for excessive vegetative growth. Plots were four 38-inch rows wide by 30 feet long, and were arranged in a randomized complete block design containing four replications. Cottonseed varieties ST6611BG2RF and DP164BG2RF were planted in 2007 and 2008, respectively. Treatments consisted of a factorial arrangements of three MC rates (none, 16, and 32 oz/A) applied at early bloom (5 to 6 white blooms per 25 feet of row), and two MC rates (none or 16 oz/A) applied at cutout (3 to 4 nodes above white bloom). All treatments were applied with a CO₂-pressurized backpack sprayer calibrated at 15 gallons/A. All other agronomics practices were conducted according to North Carolina cotton extension recommendations.

In 2007 and 2008, plant height was reduced by both the 16 and 32 oz/A rate of MC applied at early bloom. The 32 oz/A rate in 2007 reduced plant height more so than the 16 oz/A rate. In 2007, the 16 and 32 oz/A rate applied at early bloom reduced height-to-node ratio compared to the non-treated control, however during 2008 only the 32 oz/A rate reduced the height to node ratio. The effects of the 16 oz/A rate on height-to-node ratio were no different

from that of the non-treated control or the 32 oz/A rate. Early bloom applications of MC reduced the number of total nodes at the 16 and 32oz/A rates in 2007 and 2008. In both years, 32 oz/A MC applied at early bloom reduced the number of sympodial nodes. In 2007 and 2008, MC applied at early bloom had no effect on total bolls or sympodial bolls; however the 32 oz/A rate increased sympodial boll retention 19% over the non-treated control. MC applied at early bloom at the 32 oz/A rate increased the number of bolls on nodes 8-10 in 2007. Across years, MC applied at early bloom had no effect on nodes above cracked boll (NACB), percent open bolls, or defoliation efficacy. In 2007, the 32oz/A rate increased terminal re-growth compared to the non-treated control; however the 16 and 32 oz/A rate decreased basal re-growth during this same year. MC applied at early bloom had no effect on lint yield, lint percentage, or micronaire, but the 32 oz/A rate increased fiber length 1% across years. MC applied at cutout increased height-to-node ratio 2%. During 2007 and 2008, MC applied at cutout had no effect on plant characteristics, boll distribution, maturity, defoliation, re-growth, lint yield, or fiber quality.

Due to the lack of significant interactions between MC applied at early bloom and at cutout for most parameters of interest, the effects of each are independent of one another. MC applied at early bloom affected plant growth similarly to most previous findings. Based on these data, MC applied at cutout had little or no impact on maturity, re-growth potential, or lint yield.

References

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