

Cotton Field Check

Field Conditions and Comments: Late-June, 2008

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It looks like hot weather is settling in to the San Joaquin Valley for a while. As long as there is some soil moisture available to keep roots actively growing, the short spells of hot weather (110F last weekend, predicted 105+F this weekend) should not cause significant reductions in growth or damage to developing squares or even early bolls. A large part of why I don't think these temperatures will hurt fields that aren't also water stressed is that we are still relatively early in development, and developing squares or even early bolls at this point don't represent much of a strain on plant resources. Now ... if we settle in to long spells of 105+F weather coupled with hot nights, that could be more damaging to plants approaching bloom and early boll formation.

Short on Water Supplies. In fields that are short on irrigation water supplies and exposed to fairly severe water deficits as early bloom approaches, it will be important to assess the size of plants and reduced yield targets that will still cover your input costs. Luxurious early water applications that build a bigger plant than you can sustain later on in the season would be a mistake, since plants will get hit hard if you pull back or terminate irrigations and hit them with severe stress at a time like 3-4 weeks into bloom, during boll formation. In water-short fields, a better approach probably includes:

- significantly reduced N fertilizer applications to match a lower yield target (if you haven't put on the second split in your fertilizer applications at this point),
- moderate delays in irrigations, which will cause moderate stress, reduce plant size (leaf area and branch extension growth) but still avoid severe stress during this critical flowering and early boll production phase
- try to avoid major areas of fields with early afternoon wilting of leaves (even in Pima) during late squaring and early to mid-bloom. With irrigation delays, more wilting of leaves may be evident later in the afternoon, particularly on hot days. Just keep in mind that if the plants are severely wilted during a major portion of the day, they are not getting much or even any net gain from photosynthesis and may even be losing since they still respire when stressed
- in water short fields, avoiding major, early fruit losses can be very important to achieving yields you might be able to live with, since compensating for early fruit losses requires time (later-developing bolls), a longer growing season and even more water

Smoke and Reduced Light? I had a call this week about impacts of reduced light levels associated with all the smoke from forest fires (ie. will those conditions directly reduce photosynthesis and yields). That is an interesting question. Aside from direct impacts of pollutants on the plants, it can be a valid question to ask how much light levels can be reduced when forest fire smoke really stacks up. We measured mid-day levels of photosynthetically active light levels recently in the mid-SJV area and these wavelengths of light were reduced by 30 percent or more, which still would only slightly impact cotton since it is a C3-photosynthetic pathway plant. These reductions are less than with thick thunderstorm clouds, which can block out over 75 percent of photosynthetically-active wavelengths.

General Field Observations. In general, plants in fields I have been in during the past 7-10 days are showing some good growth even in some of the weaker cotton stands. Plant mapping we have done in a number of fields really show the effects of early damage associated with wind, dry conditions and early injury from thrips. Leaves in plants affected by early rough conditions are small and beat up. Most plants mapped to date tend to have shown:

- the first fruiting branch about 1+ nodes higher than typical for the varieties evaluated, suggesting a moderate additional delay in bloom :

- In looking at fields from Kern, Tulare, Kings and Fresno County the past week or so, plant development ranged from about 10-11 nodes (mid-squaring) to over 18 nodes (early bloom) In my observations, this is one of those years where it is hard to make clear generalizations about crop conditions.

There are March plantings out there that look like they made it through the colder weather in April and May just fine, with good stands, acceptable growth, and on their way at early bloom. However, there are just as many fields with more marginal plant populations, which took a hit both from colder weather, winds and drying conditions, early and sustained injury from pests such as thrips, and multiple problems with seedling loss and damage from seedling diseases such as *Rhizoctonia* and *Pythium*. Management recommendations for these widely different conditions will differ, of course.

Management Considerations?

PGR Management A number of our most widely-planted Pima and even Acala varieties tend to be plants with more potential for vigorous growth, particularly if water and nutrients are available and if early square and fruit losses occur. Higher vigor varieties or varieties with low to moderate early fruit retention can be managed to a significant degree using delayed irrigations, but if carried to an extreme this can also reduce yield potentials. If water is in short supply or too expensive, delayed irrigations can be the right approach, but you can also consider a combination of growth regulator use and irrigation management to achieve growth management goals. In summarizing more than a decade of research on Mepiquat Chloride (MC) use in SJV PIMA cotton by UCCE researchers Dan Munk, Steve Wright, Doug Munier, Brian Marsh, Ron Vargas and Bill Weir, and some more recent UCCE studies, there are some generalizations developed that can be used as rough guidelines:

- (1) the most consistent improvements in yields in University of California studies have been with sequential applications beginning at either first bloom or full bloom, with a second application about 10 to 14 days later;
- (2) the most effective application rates have been $\frac{3}{4}$ to 1 pt per acre applications using PIX formulations, with rates adjusted based upon relative plant vigor (some measure of growth or growth rate) and square and early boll retention;
- (3) pre-bloom (about 10 nodes) and first bloom applications have been most useful in vegetative growth control and to help avoid delays in defoliation, provided plant vigor has been high enough to warrant these applications;
- (4) high vigor plants with poor early square or boll retention have been the most likely plants to benefit from prebloom (about 10 nodes first application) MC applications for growth control; and
- (5) under long growing seasons and very high yield potential conditions (>3 bales/acre), field studies have shown that MC applications made too early (in terms of growth stage) or at too high an application rate can actually reduce the total number of fruiting sites, and therefore, lint yields.

Some of these generalizations are particularly true in situations where early and mid-season fruit retention is good or better, where developing fruit help exert some measure of control of vegetative growth. We recognize that for many growers concerned about keeping Pima plant growth in check, avoiding rank growth and later harvests, you may have decided long ago to hit the plants with mepiquat chloride early on (around 10-11 nodes) and repeatedly to keep a lid on growth. There are multiple approaches that can be the right choice, but our recommendation is that you still base these decisions on field observations of how the crop and year are shaping up ... don't make blanket or calendar decisions with PGR's. Plant growth measurements used in assessing relative vigor and fruit retention measurements can really pay off in helping avoid unneeded or excessive applications and potential negative impacts.