Cotton Field Check

A Cotton Management Update from UC Cooperative Extension

Field Conditions (early August, 2007) - Management Considerations

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CROP CONDITIONS – Management Considerations. Field mapping in recent years have shown that heat units required to mature out mid- to late-season bloom to open bolls range from about about 750 to 850 heat units (base 60F) for Acala and 850 to 950 heat units for Pima varieties. While accumulating that many heat units with early and mid-season bolls might take 50 to 60 days, as many as 70+ days might be required late-season, depending on the weather. The heat units required to mature and open bolls found in University of CA data sets generally suggest that flowers blooming about August 15 or so will take until the last few days of October or early November to fully develop fibers, mature and crack the bolls open for spindle picking. Later blooms have a higher likelihood of running out of heat units to fully develop and open in time for an acceptable harvest date, particularly if fall weather cools down early or rains develop. If late-season water supplies are limited or costly, it is even more important to assess the top crop for additional yield potential, and decide if it represents cotton of adequate value to warrant costs for that last irrigation. Much of the primary fiber development impacting length and strength takes place in critical periods of the first 3+ weeks after bloom, and negative impacts of stress on components of fiber quality (such as micronaire or fiber strength) will be much less if severe water stress is avoided through about 4-5 weeks after bloom. A few general comments follow based on field / plant conditions.

Field in or approaching hard vegetative cutout
Here in early to mid-August, there are or soon will be many, many fields in this condition
Fields in this condition are less likely to develop a late top crop with a big impact on final yields unless you extend the growth period by fertilizing or watering late and maintain plants in a less-stressed condition. Where limited water and late-season water costs are concerns, it will be important to decide: (1) how long you need to maintain plants in a non-stressed or mildly-stressed condition; and (2) how much of the later-developing bolls or "top crop" you can afford to mature out. Going for a major top crop often is not likely worth it under such conditions. There are a number of reasons why plants quit growing (good early fruit set, limited water or nutrients, other growth-limiting factors) – depending on the field, any one or several of these factors apply. With carbohydrate limitations associated with average leaf age and heavy fruit set, or with limited N or K, the trend expected is that these fields will be less likely to show any second wave of new growth. Small boll and late square retention in many of these fields is finally dropping markedly this past week or so, and this is to be expected as the plant winds down, even if lygus counts remain low and even though many fields have had exceptional retention in earlier weeks. Most UCCE tests are quite consistent in showing little in the way of favorable response to foliar N or K or late-water run N applications once you are much past peak bloom, particularly when close to or in cutout. Most plants in fields fitting these descriptions are past the most responsive period for supplemental nutrients Fields that are already at hard cutout and still not showing significant signs of new vegetative growth and new fruiting sites at this time are unlikely to have much potential for a late-developing top crop. However, if your field assessments instead show plants with new growth and evidence of upper canopy blooms with potential for retention during the next week or ten days, consider adjusting your last irrigations to avoid severe stress that will damage fiber quality and the ability to sustain and mature those last bolls. If you do this, be careful and avoid very late irrigations that could cause regrowth problems and delay defoliation and harvest.

Fields growing vigorously, cutout not evident soon – not as common this year as many prior years due to generally good growing conditions and decent fruit set to date

If plants are growing vigorously and have problems with low early and mid-canopy fruit retention, these fields warrant attention to managing further growth, and to pest problems (if any are impacting fruit retention). If fields have plants that are large and vigorous but with good fruit loads and recent retention that seems to be holding, irrigation practices should be evaluated as a tool for growth management and progression to readiness for harvest. Some irrigation delays and moderate stress might help, or reduced application amounts by a method such as sprinklers or alternate row irrigation might help if an option. It might be desirable to avoid severe water stresses in these fields so as to favor retention and development of later bolls, but keep in mind that there is a limit to how many fruit a plant will hold and how long you might want to wait for that fruit. Look at a calendar on occasion as a reminder that late-season bolls can take 65-75+ days from flowering to open boll. Especially in vigorous fields, don't back off on fruit retention monitoring and insect evaluations at this time – many fields have experienced some significant fruit losses over the past week or so from a number of causes (continuing or late-developing insect (lygus, etc.) pressure, competition between bolls and vegetative growth for limited carbohydrates or nutrients). Monitor fruit retention and nodes above white/yellow flower or length of upper canopy nodes to make growth is balanced and not excessive, and fruit is still being retained.

HOW LONG DOES IS TAKE TO MATURE LATE-SEASON BOLLS? Some field trials have provided evidence of limited varietal differences in the number of degree days associated with bringing a fruiting site from an open bloom to mature (open) boll. Harvest aid chemicals and weather conditions at and before defoliation can impact time required to open bolls by as much as 3 to 4+ days, which can be important some years. In general, however, harvest aids don't dramatically shorten time and heat units required to open bolls. We worked through data during the years 1998 through 2002 and came up with the generalizations shown in the following table for ranges of degree days required to go from open flower to mature, open bolls.

Table 1. Examples of differences in degree-days (base 60 F) required to go from open flower to mature, open boll (1998 to 2002 trial data from tagged blooms).

Type of cotton	Degree Days Required (base 60F)	
	Early Season Flowers	Late Season Flowers
Acala varieties (average)	900 to 1030	815 to 875
Pima varieties (average)	960 to 1050	900 to 980
Uplands with thinner boll walls	810 to 1000	775 to 875

Table 2. Long-term average daily heat units (degree days base 60 degrees F) at Shafter during specific time periods, with averages and ranges determined using 1978 to 2000 data.

Time Period	Degree-Days (base 60 degrees F) Average daily degree-days	Range of degree-days	23-year average total for time period
July 1-15	18.5	14 to 21	279
July 16-31	18.8	13 to 22	302
Aug 1-15	18.6	15 to 22	276
Aug 16-31	16.4	11 to 19	266
Sept 1-15	15.4	10 to 22	239
Sept 16-30	11.7	5 to 17	182
Oct 1-15	8.5	5 to 15	134
Oct 16-31	5.7	2 to 8	94
Nov 1-15	2.2	1 to 5	31

Many growers and extension personnel have considered this heat unit requirement for bolls in terms of the approximate date of the last flower to try to routinely carry to maturity and still meet your "target" for a workable harvest date. **In some circles, somewhere around AUGUST 20th is used as a last bloom date to try to carry to maturity**. The basis for this idea can be seen in the prior tables for Shafter in Kern County) – keep in mind that most cotton production areas further north in the SJV get fewer total heat units than Kern County most years.