

Cotton Field Check

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A Cotton Management Update from UC Cooperative Extension

Field Conditions (mid-August, 2003) and some Management Considerations

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Crop Management Considerations – Mid- to late-August. As we hit mid-August, much of the cotton crop in the SJV is either larger or more advanced in maturity than many of us expected based on the difficult weather conditions of April and May. This is generally good news, as earlier maturity helps avoid additional exposure to late-season insect pests and allows earlier harvests during better weather. As usual, though, there is a lot of variability in relative maturity seen across fields due to:

- ❑ Choice of variety and type of cotton
- ❑ Planting date and early season damage due to weather, disease and insect pests
- ❑ Severity of high temperature and water stresses, particularly during July
- ❑ Growth regulator decisions, early and mid-season fruit loss, and irrigation and fertility management decisions

Although protection of high fiber quality and acceptable yields are goals across all types of production fields, how you get there is a different road based on current crop conditions. Some general considerations based on different current field status follow:

1. fields in hard vegetative cutout with no recent growth of new leaves, no second wave of growth (yet): *(fair number of fields recently reaching this stage)*
A lot of these fields do not have a top crop that is very important to total yield. One of the reasons that they have quit growing is that they have a good fruit set that is quite a bit for a low to moderate vigor plant. Foliage in some of these fields may already be declining and not showing much vigor for any continued growth. They set fruit through early and mid-season, lost squares and small bolls during hot weather of the past month, did not start up a second wave of growth due to relatively low vigor, depleted soil water or nutrients, and will be ready for harvest aids soon. Consider using nodes above cracked boll methods or other tools to help decide harvest aid timing. If these fields are low on nitrogen and water, and upper fruit are quite mature, with open lower bolls, don't wait too long to defoliate, since you might be able to get harvests started and cut down on the chances of needing a long period of protection from whitefly and aphids.
2. fields that have been cutout for one to two weeks or more, now showing some signs of starting new leaf growth. *(quite a few fields this year might have potential to follow this pattern)* Hot weather of July followed by more moderate weather conditions the past two weeks may produce conditions favorable to new growth in many fields. If it has been a while since these fields were cutout, many plants will mature out earlier set bolls and translocated needed photosynthate and nutrients to fill out those bolls. If there is any soil water and nitrogen available, these plants may start up some vigorous new growth that can complicate defoliation, make plants more attractive to late-season pests, and in most cases, there still will not be enough heat units to turn this late growth into much additional yield. Advice would be to avoid late irrigations in these fields to limit new growth and regrowth that can cause problems and increase costs of defoliation.

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3. fields with substantial numbers of fallen / lodged plants: *(Not many fields that look like this yet, but they may occur in strong-growing, later planted fields with good water and nutrient supplies).* We saw a lot of this field condition in 2002 – hopefully less this year. High plant populations and spindly plants with good middle and upper canopy fruit set can lead to this problem. Variety plays a role, especially if a heavy top crop exists. As bolls mature and crack open, many plants will “pop” back up at least part way if plants aren’t too big. Lodged plants make penetration of pesticides and harvest aids considerably more difficult. Defoliations will require more applications, harvests may be delayed and slower. Late irrigations in these fields will further delay defoliation, can cause additional vegetative growth, and may increase incidence of boll rots.

4. fields that are still growing (no cutout yet, tall, vigorous). *(Many fields that are in this condition as of mid-August, with good yield potential but big plants at relatively high NAWF/NAYF).* There are some large, vigorous fields out there that were recently irrigated. It is easy to understand why these were being irrigated, since the ones we looked at had very good continued fruit set on large plants. Some of these fields were Pima in clay loam soils, with continued growth and flowering. With concerns for late harvests and the threat of whitefly and late aphids, these fields require monitoring to make sure any late-season irrigation decisions don’t further delay maturity. There is no doubt that some of these fields are going to yield really well and still are setting fruit. Monitor progression of nodes above white/yellow flower, and look at a calendar occasionally as a reminder that on the average these late-season bolls are going to take nearly 70 days from flowering to open boll.

Square and Small Boll Loss: Commentary from Bob Hutmacher There has been a lot of mention in MITEFAX and elsewhere of late regarding heat-related square and small fruit loss in Acala cotton due to our July weather. Research in Arizona and CA and our field observations have generally indicated that loss of squares and young bolls is often related to loss of pollen viability when daytime temperatures exceed the 107 to 110 F range, especially when night-time low temperatures stay above 82-85 F. Many of our temperatures during July approached but did not routinely exceed this range in most of the SJV. With this in mind, why is it common in some fields this year to see squares and even small bolls “frozen” on the plants (brown, dead squares widely seen in late July and early August)? Even if temperatures don’t hit real extreme levels, some fruit loss can still be related to high temperatures through the reduction in carbohydrate supply that occurs with hot or cloudy weather (due to both lower photosynthetic rates during the day and higher respiration rates at night).

If that is true, why were some Acala fields much harder hit by hot weather than others? One factor certainly is planting date and crop growth stage when the hot July weather hit – responses to high temperatures are different in plants that are still vegetative or in early bloom than in plants at or near mid to peak bloom. From my observations, it is my opinion that another significant factor in fruit loss in Acala fields was the combination of high temperatures and water stress. Some irrigations were still made on a calendar basis, or were delayed to speed up maturity or control growth in plants (not a bad idea in some fields with high vigor problems). However, 105+F temperatures combined with water stress severe enough to cause mid-afternoon leaf wilt (seen quite a lot this year) can be a rough combination that can also promote fruit loss.

Combined Effects of Multiple Stresses. To the degree possible, avoid the combination of severe water deficits or aeration stress (waterlogging) with the high temperature stress that comes with days of about 105F or higher temperatures. Water stress produced by delayed irrigations can be used effectively to manage tendencies for excessive growth, but particular care should be exercised during very hot weather to avoid stress severe enough to cause fruit loss and very early cutout. Aeration stress and water deficits both limit the ability of plants to cool themselves with evaporative cooling, resulting in a combined effect that can hurt the plant more than either stress alone. High temperature and water stress limit the ability of the plants to produce adequate carbohydrates during the high demand period of fruit set, and can lead to direct losses of squares and bolls, and reduced ability to maintain production of new fruiting sites and vegetative growth.