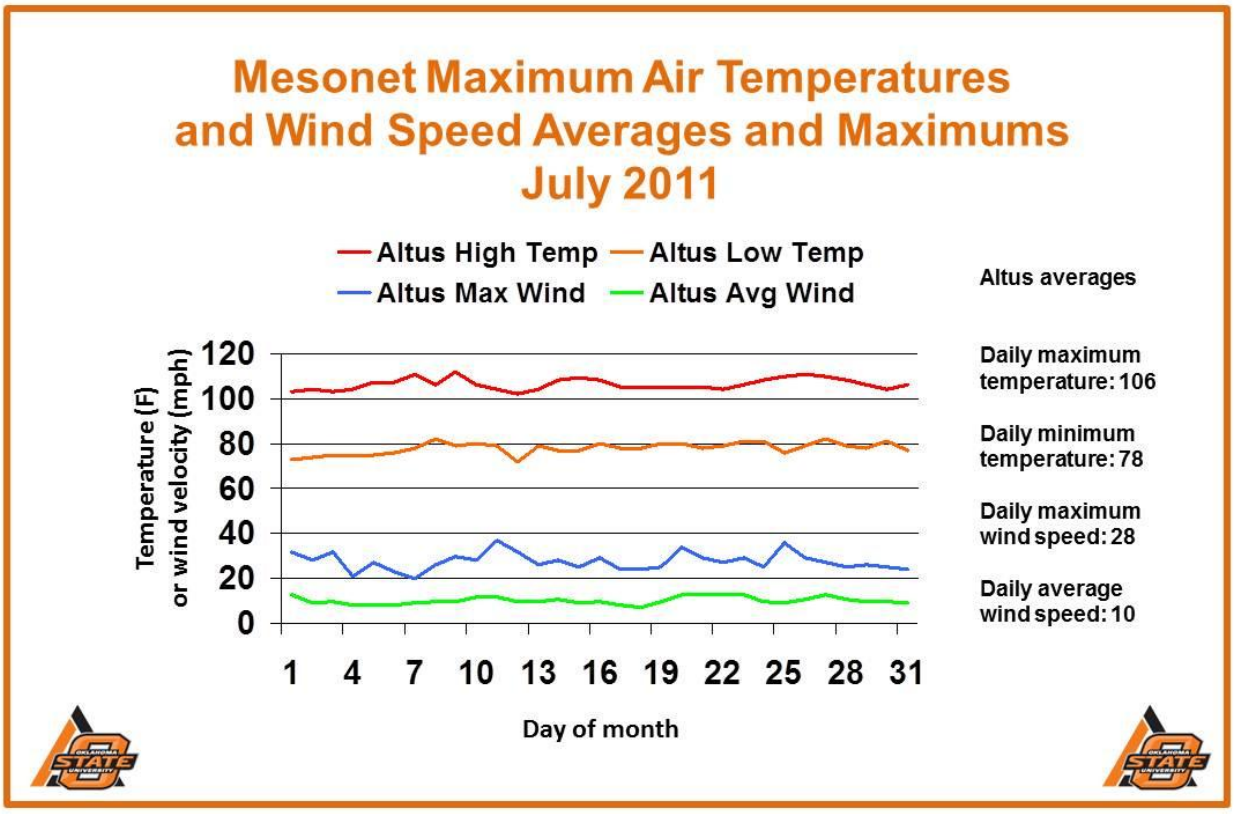
Cotton Comments

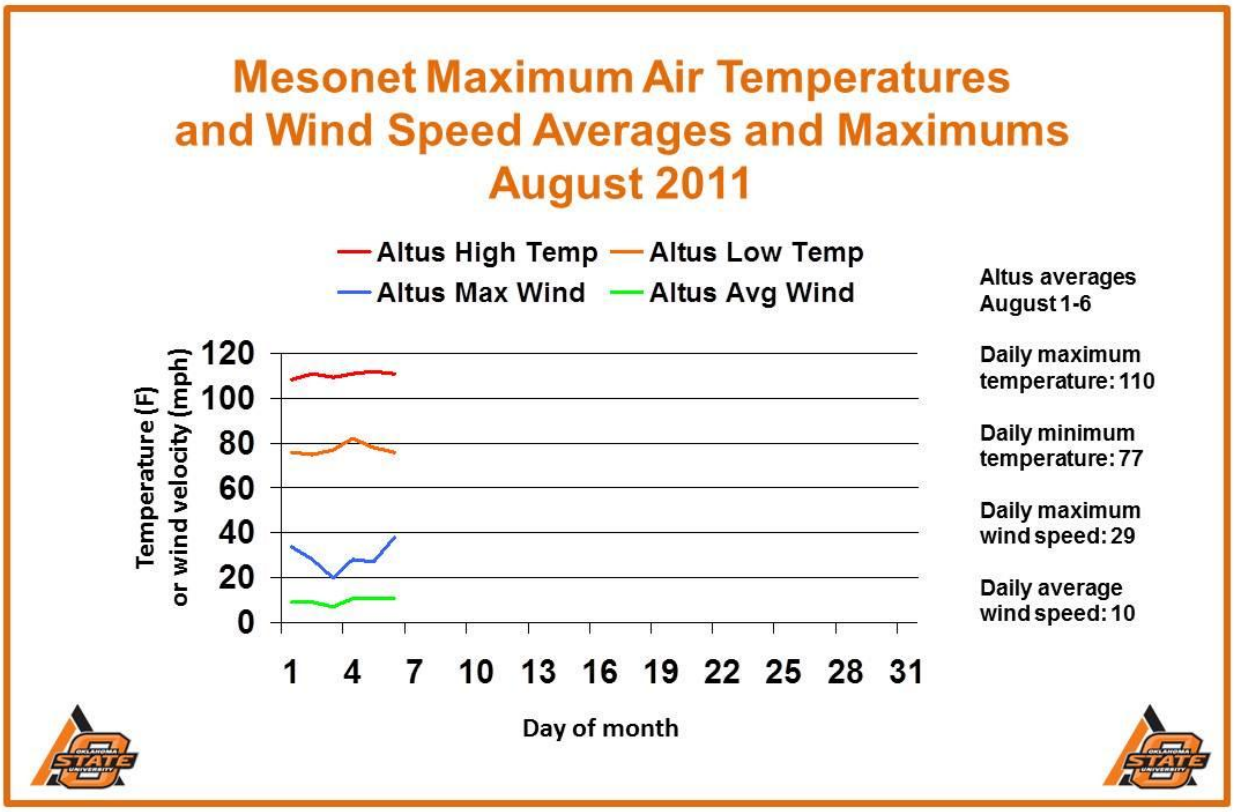
OSU Southwest Oklahoma Research and Extension Center
Altus, OK

August 8, 2011 Volume 1 Edition 11

Crop Update

The Great Drought of 2011 continues with its oppressive and devastating conditions. Mesonet high temperatures at the Altus station averaged 106 degrees for the entire month of July, and 78 degrees for the lows. Record high temperatures have continued. This results in an average of daytime high and low temperatures for the entire month at 92 degrees. According to the Altus Mesonet station, since May 15 pan evaporation has been 57.4 inches.





Producers with surviving cotton have carried this crop a long way and it has been a valiant effort. However, the unrelenting heat and lack of rainfall over most of the region have resulted in difficult decisions by many producers to be made soon. In some fields with fruit retention issues, I observed normal fruiting branch development around node 9 or 10. The node where first fruit retention occurred was about 13 or 14. This was likely caused by heat stress which resulted in abnormal four bract squares and early square/bloom abortion of these fruit. I have observed few four bract bolls exhibiting abnormal calyx development and those with extruded stigmas (a floral abnormality) being retained this year. **Accelerated maturity because of heat and moisture stress in many fields has resulted in a compressed blooming period in surviving dryland and some irrigated fields where well output was severely reduced back in July. In these fields which have "bloomed out of the top" (or through the terminal) all yield potential has been set. In my opinion, they should be candidates for the boll count insurance adjustment method.**

Cotton is crumbling under the searing heat which has affected fruit retention in irrigated fields where diminishing irrigation capacity has occurred. Groundwater sources are diminishing in many areas, and some producers with center pivots have abandoned parts of fields in order to concentrate what irrigation they have on a smaller portion. Abandoned "pies" are indicating extreme stress. No rainfall to supplement irrigation has occurred, which is the inverse of what most systems were designed for – with irrigation supplemental to rainfall. Mesonet cotton crop ET for a May 15 planting date at Altus for the past week was about 3 inches. Irrigation systems with spray nozzles are applying

about 0.2-0.3 inches per day which equals 1.4 to 2.1 inches per week. This results in about 46% and 70% ET replacement, respectively. Higher ET replacement should keep the crop moving forward unless square or boll abortion due to four-bract (heat stress) abnormalities is encountered.

Using COTMAN Concepts

We are rapidly approaching the latest possible cutout dates when considering the Bollman component of COTMAN. COTMAN is a cotton management program developed with Cotton Incorporated Core funding. This funding supported cooperative research conducted by several land-grant institutions across the Cotton Belt. **This program assumes that 850 cotton heat units past blooming are necessary to produce a reasonably mature boll.**

When using 60 degrees (F) as the developmental threshold, cotton heat units (also called DD60 heat units) are defined as:

$$\frac{\text{daily high temperature}}{\text{daily low temperature}} = \text{average temperature}$$

average temperature – 60 = daily cotton heat units

When totaled for all later days from a certain date, this can provide useful information. The COTMAN latest possible cutout date is defined as the last date on which 850 heat units can be obtained before daily heat units diminish to zero because of cool temperatures. Long-term weather data are used to compute this and two probabilities or risk levels are provided. The first is the date at which in 85% of the years, in the long-term weather data set submitted, that 850 heat units past bloom could be obtained. The second is the date at which 850 heat units past bloom could be obtained in 50% of the years. The COTMAN team at the University of Arkansas computed the 50% probability date to be August 20th for the 1948-2007 time period. The 85% probability date for Altus was August 13th. Therefore, one can see that the window for setting bolls is closing in the area. The 2011 growing season has provided an abbreviated blooming period in many fields because of heat and moisture stress, because of few nodes above white flower at first bloom. Therefore, the maturity of the cotton has been accelerated and the bloom period for some fields will be reduced by 2 weeks or so compared to more normal years. Once a cotton field blooms in the top (or the terminal) all of the possible yield potential is set. Even if substantial rainfall occurs soon in “hard cutout” fields, the cotton will take some time to recover and to initiate another round of mainstem node production in the terminal and new squares. These new squares would take about 20 days or so to produce a bloom. This indicates that any new flower production would be well beyond the Altus COTMAN 50% probability date of August 20, indicating that there is a low likelihood of obtaining mature bolls. Surviving dryland fields (and some irrigated where irrigation capacity crashed earlier) that were not feasible for insurance adjustment using the stand count method should be seriously

considered for the boll count method as they have reached a level of maturity where all bolls are set that will contribute to final yield.

For a copy of the COTMAN Bollman cutout dates for various locations across the Cotton Belt (including Altus), click here:

Irrigation Termination Issues

NAWF counts in some irrigated program survey fields have reached the COTMAN definition of cutout (NAWF = 5) triggering the heat unit countdown for irrigation termination. Hard cutout, as I define it, can be described as "cotton blooming in the terminal." For more information on this see the July 28th issue.

The time has come for many producers to assess yield potential which has been severely challenged by the drought and in many cases fruit retention issues. All fields bloomed out the top should be watched for potential irrigation termination within 500 heat units or so after "blooming out the top." It should be noted that once irrigation ceases, fields will crash within a few days under this intense heat and lack of rainfall.

Fields that entered bloom at the COTMAN criterion for cutout (nodes above white flower or NAWF=5) and have struggled with irrigation delivery most likely will not produce enough lint for profitable production. Producers with fields such as this may wish to consult their insurance adjusters to determine the feasibility of terminating irrigation immediately. Boll counts taken now in fields such as this should provide a reasonably good indication of yield potential. One should also consider that under the high stress environment, mature boll size could be substantially reduced.

When using the COTMAN program **various investigators across the Cotton Belt have noted that irrigation termination at about 400 to 600 DD60 heat units past cutout (here defined as NAWF = 5 on a steep decline toward hard cutout or blooming in the top) has been reasonable. However, project reports published in the Beltwide Cotton Conference Proceedings and other publications lacked information on soil profile moisture status in the trials at the time irrigation was terminated.**

One low yielding trial (about a bale per acre) conducted by Extension IPM agents at the Texas AgriLife AGCARES facility at Lamesa in 2003 indicated that irrigation termination at 600 DD60s past the date the crop had 5 NAWF optimized yield and net returns from LEPA irrigation.

A sub-surface drip irrigated (SDI) project conducted by Texas AgriLife Extension Service personnel on 1,100 lb per acre cotton in the St. Lawrence area indicated that untimely early termination based on heat units past cutout resulted in yield losses.

However, based on their study it was concluded that few benefits were noted by extending SDI irrigation past 500 HU after NAWF = 5.

Using heat units after cutout is a good general guide, but with the extreme heat and "inflated heat units" because of triple digit temperatures, it will likely not be exact. I will feel better about this after I see some fields nearing this threshold. Salinity will complicate this.

The value of continued center pivot irrigation and SDI after bolls begin to open is probably questionable, unless extremely high temperatures and high ET are encountered and the field has a depleted moisture profile and a late boll load. Generally, we observe about 2 to 5 percent boll opening per day once bolls begin to open. This implies that if the last irrigation is made at a few percent open bolls, then it should take about 10 days to reach 30-60 percent open bolls. I submit that due to our extreme environment this year, once bolls begin to open, the boll opening rate will be very high, perhaps near the 5 percent per day rate.

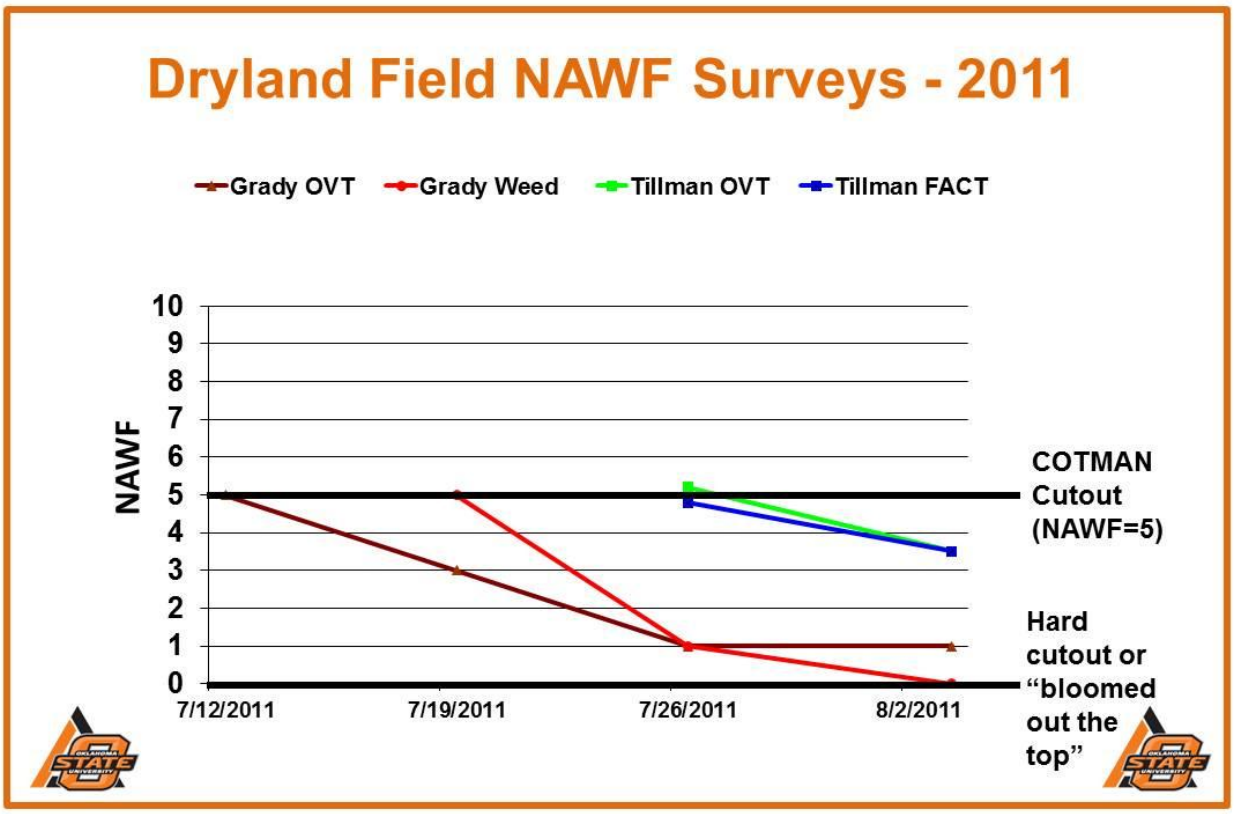
This growing season has resulted in extremely high irrigation expenses for many producers. The last irrigation should provide just enough plant available moisture to retain and mature all the bolls that have a reasonable chance of producing lint of acceptable quality under normal growing conditions. Normally a boll will be retained once it reaches 10 to 14 days after bloom. The goal is to avoid excessive moisture stress at least until the final bloom to be taken to the gin becomes about a 10 to 14 day old boll. This will reduce the likelihood of small bolls shedding due to water stress. After that, late bolls can handle more stress. For a boll set on August 10th, excessive moisture stress should be avoided at least through the end of the month, unless rainfall can offset irrigation requirement.

Click there to see a table that contains irrigation deficit replacement values based on irrigation capacity.

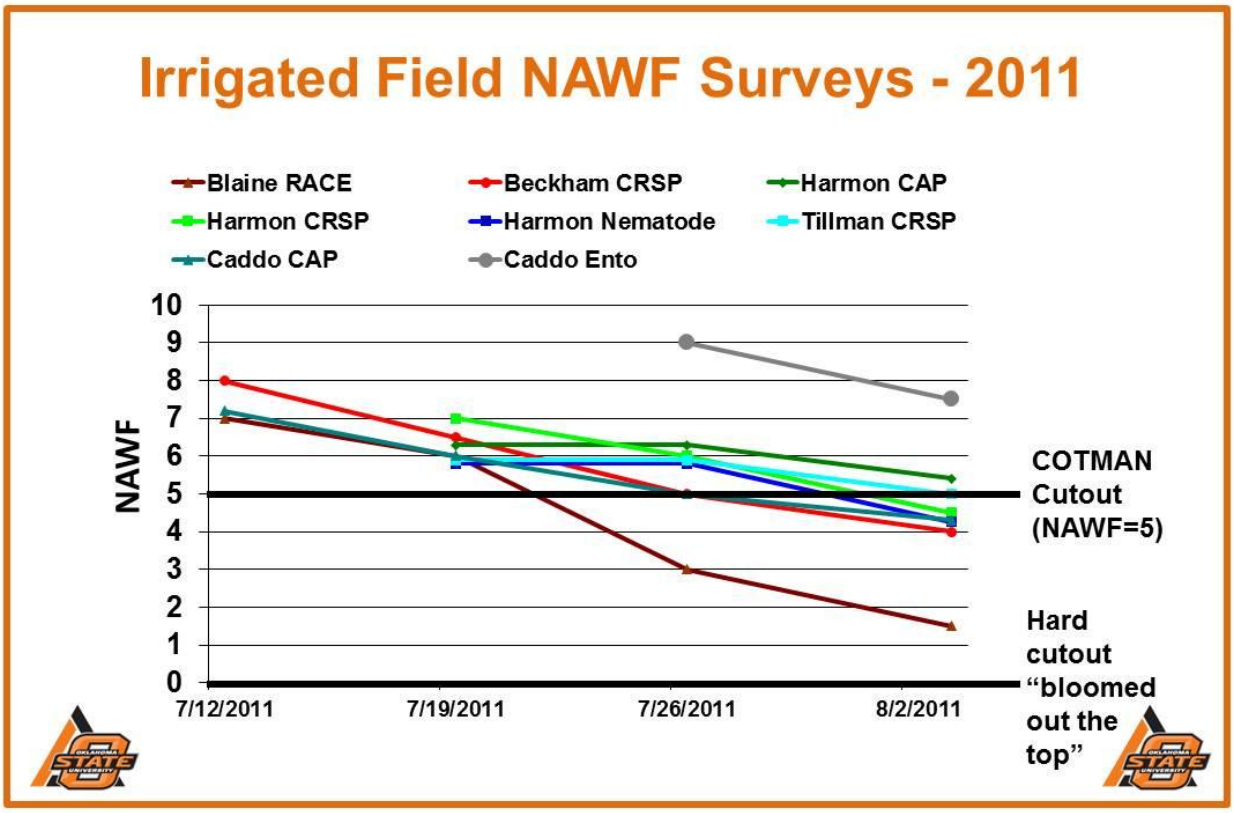
Program Survey Field Status

All of our surviving program dryland fields initiated first bloom at NAWF=5 which indicated poor yield potential (and technically considered at cutout at first bloom using the COTMAN criterion) without a significant rainfall event. This rainfall event has not occurred. Our dryland official variety trial at Chickasha had nearly completed the blooming period (had about one node above white flower) this week and will be finished soon. The Grady Weed project site's blooming period had ceased by August 3rd. Two Tillman County trials (the official dryland variety site) and the no-till FACT plot were somehow hanging on at NAWF=3 on August 3rd despite no significant rainfall since around May 19th. Based on white blooms progressing up the mainstem at the rate of about 3 days/node, this cotton should be blooming in the terminal around August 10th.

In other words, the Tillman County dryland fields will complete the bloom cycle, with all yield potential set, in around August 10th.



Irrigated fields are a mixed bag. The pivot irrigated Blaine County RACE trial has been less than 5 NAWF since about July 22. This event triggered the countdown to irrigation termination (see below). In late July or early August, other fields including the furrow irrigated Harmon County Extension Variety Trial, as well as the pivot irrigated (Beckham County Extension Variety, Harmon County Nematode, Caddo County CAP, Tillman County Extension Variety) trials all went below or close to NAWF=5. The Caddo entomology project was somewhat late planted, was 9 NAWF at first bloom, and has been provided excellent irrigation thus far. This indicates that we need to be tracking heat unit accumulation in these fields.



Yield Estimation

Although a very risky endeavor, estimation of cotton yields will be important this year. There is a Texas AgriLife Extension Service publication which deals with this issue. To read that document., click here

Click here to see the Texas AgriLife Extension yield estimation publication

This publication takes a fairly simple approach and is “user friendly.” For a more complicated and thorough treatment of the subject, click here to see an older publication generated by Dr. Will McCarty, former Extension cotton specialist from Mississippi State University.

Click here to see the Mississippi State University Extension yield estimation publication

I obtained this from a MSU Web site several years ago. This publication considers many more factors such as numerous row spacings, boll sizes, and two estimated lint percentage levels (35% and 38% picked lint percentages of the SEEDCOTTON). In my opinion, because of boll size, seed set, and other factors, yield estimation should be approached with trepidation, especially in drought years.

Basically it indicates that it takes about 155,700 normal (average of 4.0 g seedcotton/boll = 1.4 g lint assuming a lint percent for seedcotton of 35%) bolls are required to produce a 480-lb bale of cotton. This is equivalent to about 325 bolls per lb of lint. For 40-inch rows this calculates to 11.9 bolls per row-ft for a one bale/acre yield (155,700 bolls/13,068 row-ft per acre for 40-inch rows). This is very close to the “one boll per inch = one bale per acre” number that many crop watchers use to estimate yields in 40-inch rows. For 30-inch rows this works out to 8.9 bolls per row-ft for a one bale/acre yield (155,700 bolls/17,424 row-ft per acre for 30-inch rows). For drought stressed bolls the number of bolls required will likely increase substantially.

Crop Loss Claim Deadline Approaching

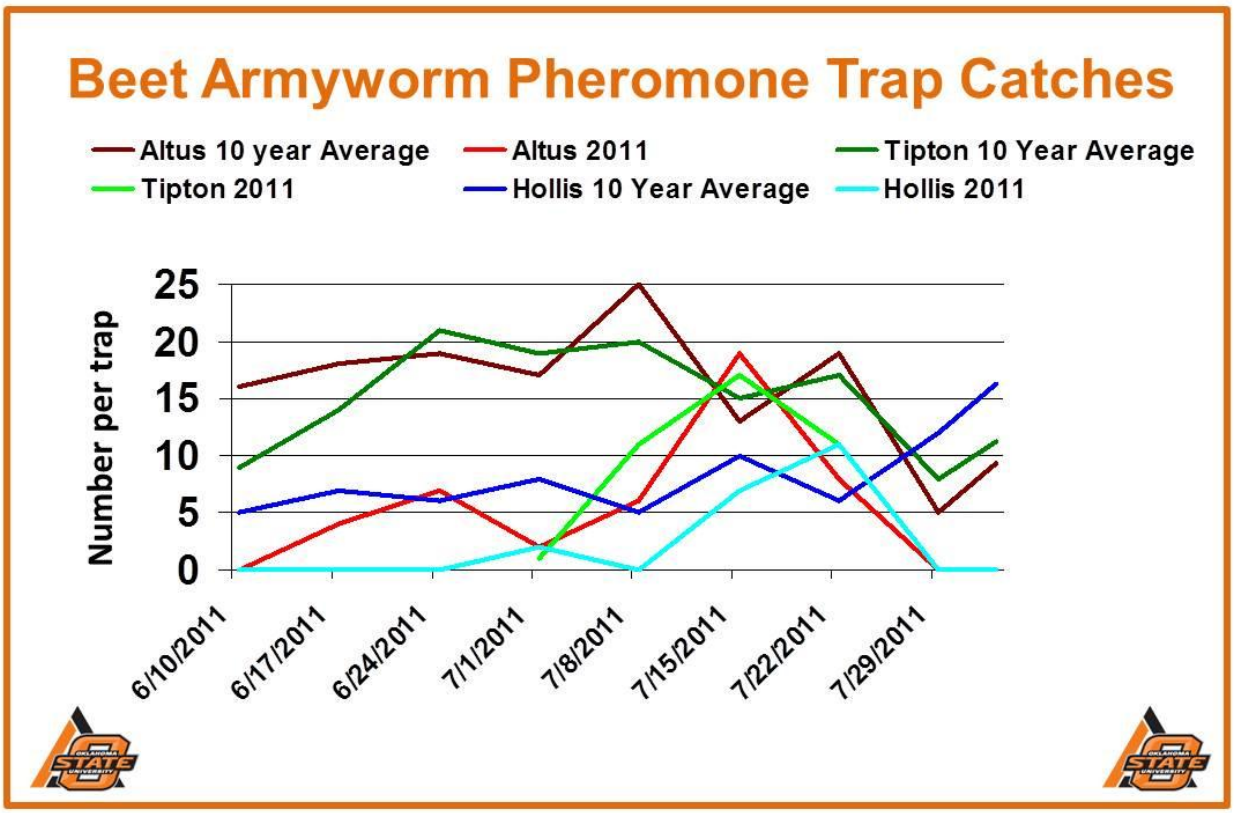
A quick reminder: Producers need to get paperwork with technology providers (such as Monsanto, Bayer CropScience, Dow AgroSciences) filed as time permits. The crop loss submission deadline is August 31. This would include storm/hail losses.

Insect Update

After conversations with various consultants and conducting field surveys in seven counties this week, the insect outlook is as follows:

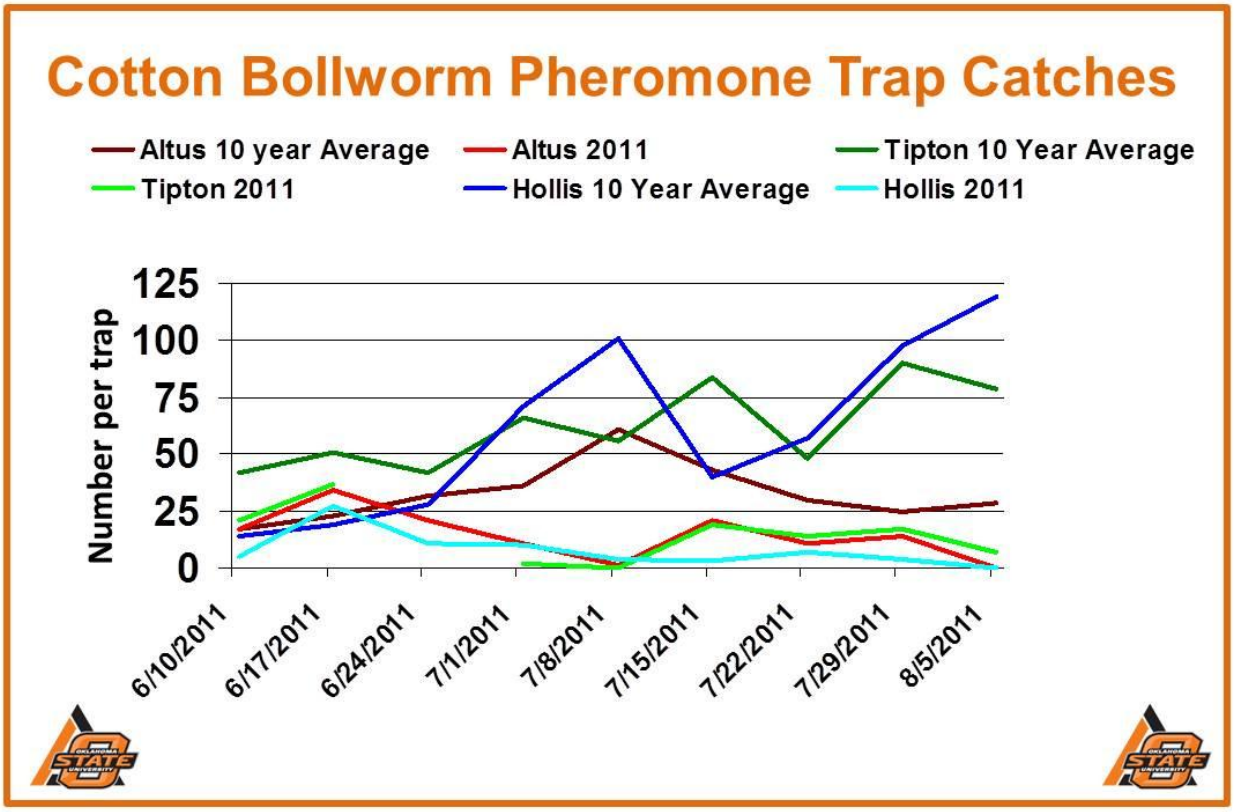
Moth activity:

Beet armyworm moths are still active in irrigated fields. No damage has been observed in Bt cotton.

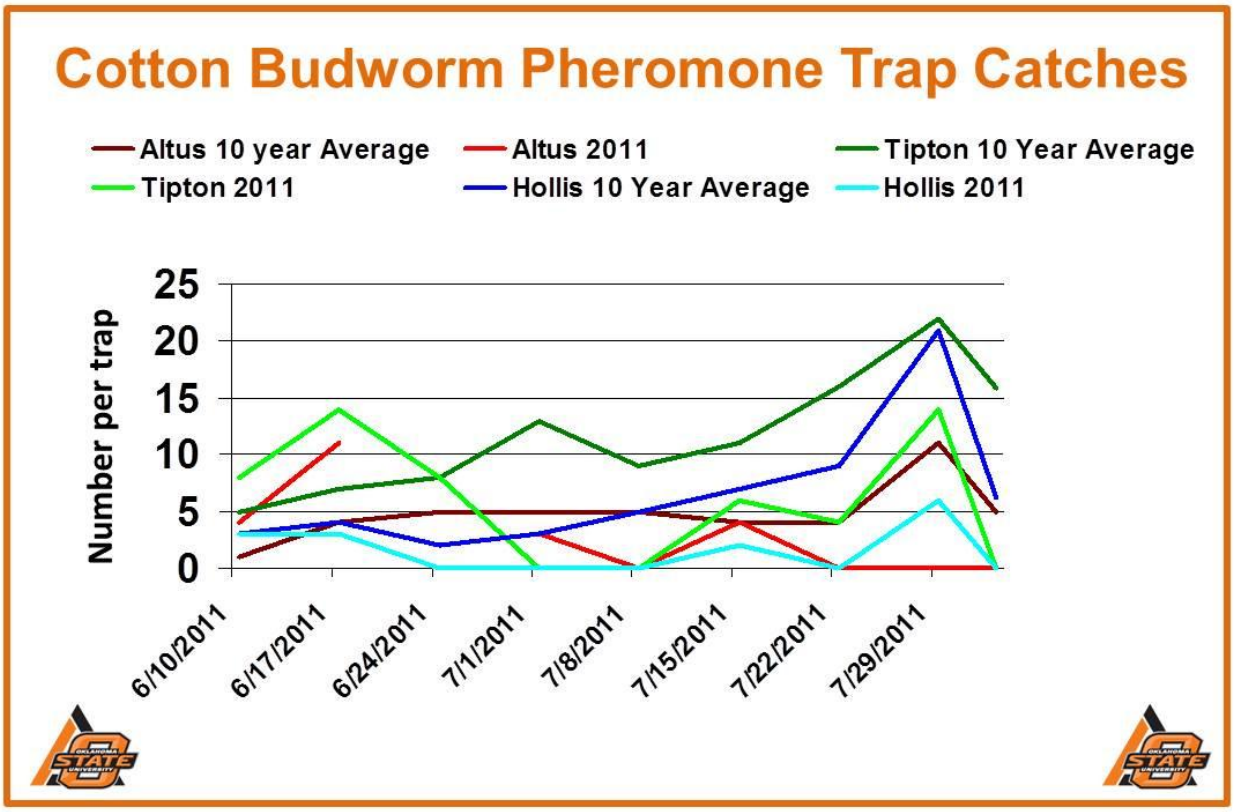


Beet armyworm moth

Bollworm moths remain below our 10-year average with all traps exhibiting zero catches except the Tipton location with only 7 moths, and no economically damaging populations have been observed in Bt or NON Bt cotton. Tobacco budworm moth traps counts were zero.



Cotton bollworm moth



Tobacco budworm moth

Light lygus bug pressure has been noted in the Americot monthly cotton report for Southwest Oklahoma and the Northern Rolling Plains area. The survey fields and reports from various consultants indicate no population has been detected. This demonstrates that EVERY field needs to be scouted regularly.

Photos courtesy of Dr. David Kerns

With most fields at the “flower garden” stage, pests will be moving to the lush fields that are left. Infestations can occur suddenly and in damaging populations if you are one of the “lucky” ones. If you have one of these lush fields you need to scout thoroughly and frequently.

No other insect issues have been reported. If you have any questions, please contact Extension personnel.

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