Cotton Comments

OSU Southwest Oklahoma Research and Extension Center
Altus, OK

EXTENSION

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Crop Update

Crop progress in many areas is proceeding rapidly toward bloom. Growers have been busy with weed and early season insect control, as well as trying to get the irrigation systems going. Crop damage from phenoxy herbicide volatilization/drift has been noted in some areas. Otherwise, ample soil profile moisture has carried the late planted crop. Recently, high temperatures have been in the triple-digits. As long as we have good moisture, the late 2015 crop will respond to this “cotton growing weather.” Irrigation has been initiated in some areas, including the Lugert-Altus Irrigation District. It is great to see water in the canals for the first time since 2011. Other areas such as eastern Tillman, and western Jackson across Harmon to the state line received good rainfall again last week. Western Tillman and eastern Jackson counties missed the mark.

Crop acreage numbers will begin to firm up soon. The recent June 30, 2015 USDA-NASS report indicates US upland cotton acreage is down 18%. This report indicated Oklahoma cotton acreage would increase from 240,000 in 2014 to 250,000 in 2015. I believe this number is overestimated. Oklahoma was the only cotton state in that report to increase acres, and Texas was down a million acres to 5.2. Multiple reasons exist for this. We lost nearly the entire month of May due to high rainfall, so our crop was planted in the last few days of May or in June. Many growers on the northern fringe of production don’t like to plant late due to early freeze risk. Crop input costs including seed, technology fees, and extra herbicide applications to combat resistant weeds are pricey, especially with current lint and seed prices. It will be interesting to see where this sorts out, but I think NASS has overestimated our acres.

Plant Monitoring

Normal cotton development indicates that a mainstem node should develop on the plant every 3 days and with excellent conditions (good plant health, water) perhaps every 2.7 days. Most cotton has moved into the square stage. Earlier planted fields should be blooming soon. That will be a welcomed site due to the lateness of our crop. It normally it takes about 21 days for a pinhead square to develop into a bloom. Retaining early fruit is an important component of managing for earliness. During the pre-bloom period, we like to see at least 75-85% square retention. Hopefully well maintained fields will retain nearly 100% of pre-bloom squares. Monitoring fruiting is an important management consideration. First position fruit is very quickly counted, and is generally adequate for “getting a handle on the crop” (see Figure 1). It will be important to check fields for nodes above white flower (NAWF) at early bloom to assess the yield potential and vigor at that time. At early bloom, up to 80% of the harvestable crop will be on the plant in the form of squares and blooms. At least 85% square retention going into the first week of bloom is the goal. Plant mapping can be used to help monitor the progress of the crop and determine some important crop factors.

Important plant mapping data at early bloom are:

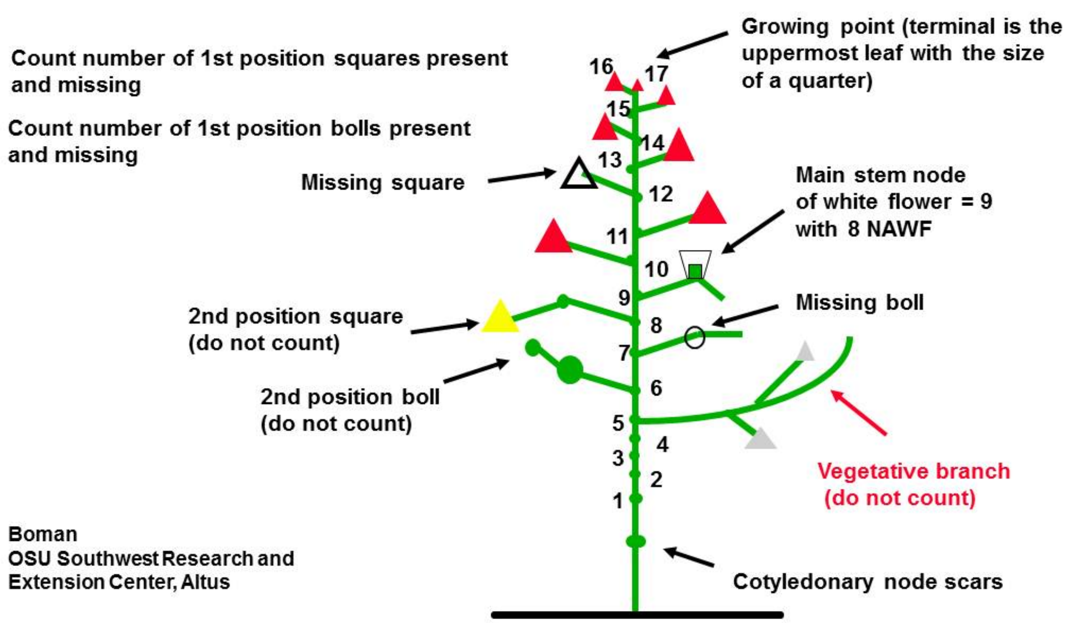
1. Total 1st position squares present and missing: (retained squares / total square sites = % square retention). Square retention goal is 75 - 85% 14 days after early bloom.

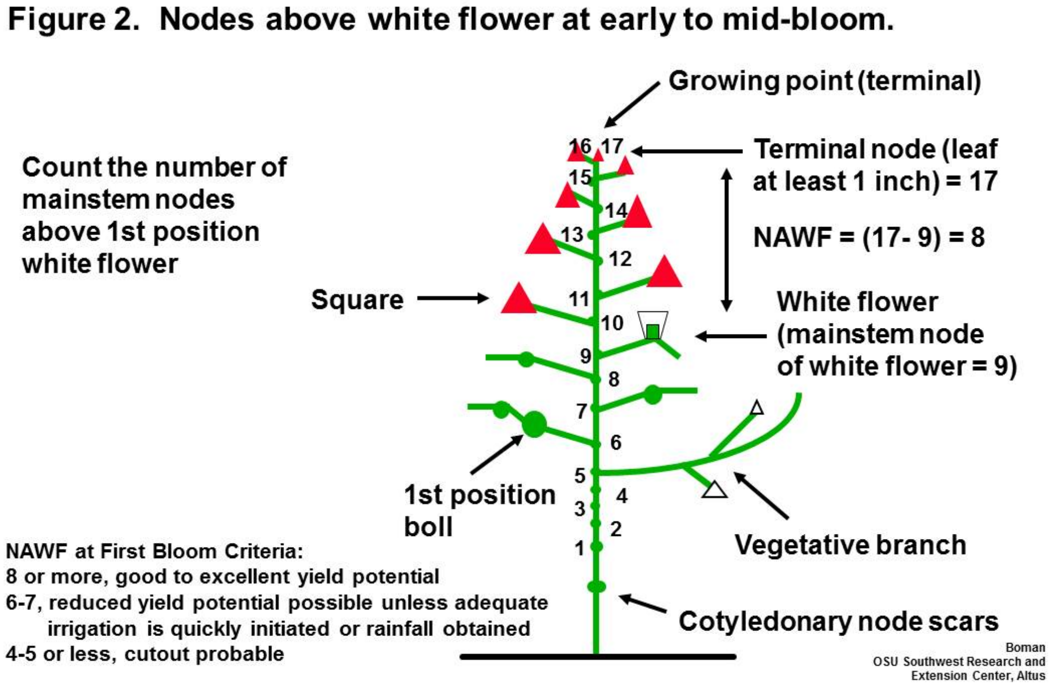
2. Total 1st position bolls present and missing: (retained bolls / total boll sites = % boll retention)

3. Nodes above white flower (NAWF). To determine NAWF see Figure 2.

Nodes above white flower at first bloom gives an indication of crop vigor and yield potential. Typically, NAWF should be high at first bloom and then decrease as the boll load ties down the plant, and mainstem node production rate slows or ceases. Eight or more NAWF could be considered excellent, 6-7 – reduced yield potential possible unless adequate irrigation is quickly initiated or rainfall is obtained, 4-5 or less - cutout imminent on determinate varieties. **It will be important to track NAWF averages weekly for each field, as key management decisions later in the season can be assisted if the hard cutout date is known.**

Figure 1. Early bloom plant mapping using first position fruiting sites.





Click here for a publication on Monitoring Cotton Pre-Bloom Fruiting In Oklahoma.

Click here for a publication on Monitoring Cotton Post-Bloom Fruiting in Oklahoma. (This publication discusses the importance and utility of tracking nodes above white flower.)

Click here for a Nodes Above White Flower Tracking Form.

Phenoxy Damage

Reports of phenoxy herbicide drift damage have been noted in several counties. Yield effects from this type of damage are difficult to quantify. Yield losses are most pronounced when cotton is exposed during the squaring stage. The amount of injury is rate dependent, but any injury can cause a delay in blooming. If the maturity is delayed substantially, a significant negative impact on yield is usually observed. If this happens to an already late planted crop, it can be disastrous if an early freeze is encountered. Many times phenoxy herbicide injury in cotton can be from a single “drift event”. If so, then the new leaves in the terminal will not show continued damage (“leaf strapping”) and fruit development may not be ruinously interrupted. Fields that experience high single dose events or multiple sustained doses of phenoxy herbicide over time (perhaps from multiple “drift events”) may have “leaf strapping” and fruiting impact for several weeks. This can be a real yield killer. The only thing that can be done is to manage the crop as best as possible and watch the fruit retention. This is a difficult situation, and each field (or even areas of a field) can be different based on the nature of the drift event, cotton growth stage, future growth potential (soil moisture level), etc. Critical observations include 1) when will the oldest remaining unaffected squares potentially bloom? (what calendar date); 2) what is the square retention on the plants?; 3) what is the last effective bloom date (calendar date) to produce a reasonably mature boll for the area?; and 4) what is the soil moisture level? (to drive yield potential).

Early season phenoxy herbicide damage in cotton.

Mid-season phenoxy herbicide damage in cotton.

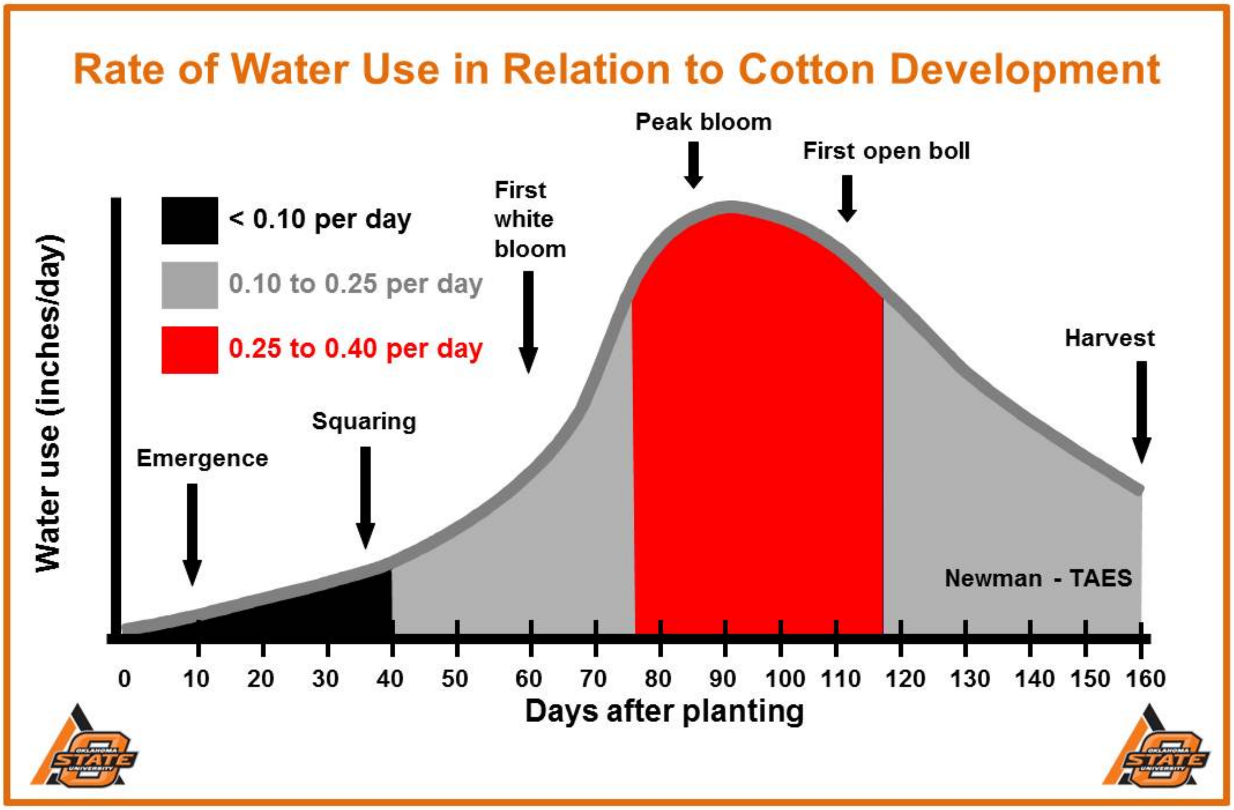
Irrigation Requirement

Many producers have initiated irrigation. Crop evapotranspiration (combined losses of water due to evaporation and crop transpiration) models can generally do a good job of predicting crop water use. The Mesonet provides a good tool that can be useful to estimate crop ET. A while back Dr. Jason Warren and I assembled a factsheet which provides considerable information pertaining to cotton irrigation management and concerns.

Click here for PSS-2406 Understanding Cotton Irrigation Requirements in Oklahoma.

Crop Water Use Patterns

Seasonal water (combined rainfall and irrigation) use for adequately watered cotton is probably about 24 inches in southwestern Oklahoma. Figure 1 illustrates the typical seasonal water use pattern for cotton produced in the Texas High Plains region, and this should be reasonably similar in our area.



From planting to square initiation (a period of about 40 days) evapotranspiration (ET) is generally less than 0.1 inches per day. Plant water requirements are low due to the limited leaf area. Most of the water used is extracted from the top foot of soil. The bulk of the water loss during this period is due to evaporation.

Water use (ET) increases to 0.1 to 0.3 inches per day during the square to early bloom stage (40 to 75 days after planting). At this stage leaf canopy and roots develop rapidly, and transpiration exceeds evaporation. Moisture extraction occurs mainly from the top 2 feet of soil although the taproot and some feeder roots extend to deeper depths if unimpeded.

From early bloom to the opening of the first bolls (usually 75 to 120 days after planting), ET values of 0.25 to 0.35 inches per day are common. At this stage, plants have attained their maximum leaf canopies and root densities. Moisture may be extracted from deeper in the entire soil profile, if available. ET values may exceed 0.4 inch per day during the peak bloom period. During the extreme stress of the summer of 2011, some days had crop ET values that approached 0.55 inches per day.

Following the opening of the first bolls until crop termination, ET generally declines from about 0.25 inches per day to as little as 0.1 inch per day. Actual water use will vary with the condition of the plant, soil moisture status and general growing conditions. If regrowth occurs during periods of ample moisture and warm temperatures, ET levels can increase dramatically, thereby rapidly depleting soil moisture reserves which otherwise could be utilized by subsequent crops.

Stress Sensitive Periods

Fruit production, retention and shedding are closely related to availability of soil moisture. Production is optimized with an available moisture status that allows uninterrupted development of fruiting positions while avoiding excessive vegetative development on the one hand, or fruit shedding on the other. High moisture stress during the peak flowering period can have a pronounced negative effect on yield. However, stress either early or late in the blooming period also result in significant yield reductions. Severe moisture stress should be avoided throughout the crop development period. Early irrigations may be justified to maintain adequate but not excessive vegetative growth. Late season water stress may be acceptable or even desirable because it hastens cut-out and results in shedding of fruit that would not normally mature and potentially contribute to low micronaire if a cooler than normal fall is encountered.

Crop Evapotranspiration

Crop ET models can generally do a good job of predicting crop water use. The Mesonet provides a good tool that can be useful to estimate crop ET. It can be found on the AgWeather page. First go to:

Oklahoma Mesonet Irrigation Planner

Then, click on Change Site (select the nearest Mesonet Station to the field in question). Then select Cotton. Then select Planting Date, and input the planting date for the field in question. Then click Get Data. A page with a table will be generated. This table will provide a quick estimate of daily crop ET, accumulated ET, rainfall, accumulated rainfall, and the water balance. The modeled crop ET for each day is listed in one column and Accumulated Evapotranspiration total in inches will be listed in another. The Irrigation Planner can be of great value to determine how much water to apply. It should be noted that the pumping capacity and efficiency of the specific system needs to be considered.

Irrigation systems vary in terms of application efficiency and can be negatively impacted by adverse environmental conditions. High temperatures and high winds can reduce application efficiencies for all systems with the exception of well managed sub-surface drip. Center pivot spray irrigation with short drops under high wind conditions will have lower efficiency than a system with longer drops which deliver water closer to the crop canopy. When determining how much irrigation water to apply, several factors must be considered. One is irrigation capacity. Higher capacity irrigation wells allow producers to apply more water in less time. Some “catch up” is possible if the system “gets behind.” With lower irrigation capacity, it will be necessary to keep the system applying water to meet crop requirement. This requires knowledge of the irrigation system capacity, nozzle package and groundspeed travel of the pivot. These are vitally important in order to fine tune irrigation application rates to meet crop ET demand without over or under applying water.

Crop ET demand (which can be reasonably estimated by the Mesonet site described above) will increase substantially once the squaring stage is reached and will continue through late boll set then will diminish once open bolls appear. Another factor is irrigation system type. Application efficiency information provided by Jim Bordovsky, Research Engineer with Texas A&M AgriLife Research at Halfway indicates that flood/furrow typically ranges from 40-80%, center pivot sprinkler/spray ranges from 65-90%, center pivot low energy precision application (LEPA) ranges from 85-95%, and sub-surface drip ranges from 85-99%.

An important consideration is water quality. High salinity water can adversely affect crop performance, if it is the sole source of water input for the crop. Saline irrigation water may require the application of a "leaching fraction" to reduce soil salinity. This means that irrigation in excess of crop ET ("over irrigation") would be necessary to reduce salinity accumulation in the profile. The amount of accumulated soil salinity in our area has likely been reduced by recent record May rainfall. Flushing of the bad constituents through the profile has likely been accomplished in many affected fields that had issues during the past several drought years. Hopefully water quality has improved due to recent recharge.

If using a spray system make sure to use nozzle applicators that generate large droplet sizes. This should reduce evaporation losses during application. Apply as high a quantity as possible without generating unacceptable runoff. Apply at least 1 inch per application in order to get even a "minimum" amount of water into the soil. This amount can be applied using a system with slightly less than 3 gpm per acre on a 120-acre center pivot. Temperatures of 100 degrees, high winds, and low relative humidity can result in ET values of up to 0.5 inch/day.

For a handout concerning ET replacement for varying center pivot pumping capacities and delivery efficiencies, click below:

Cotton ET Replacement for 60 Acre Pivot Irrigation Capacities and Efficiencies

Cotton ET Replacement for 120 Acre Pivot Irrigation Capacities and Efficiencies

Mesonet Irrigation Planner Water Use Results

I have received a few calls concerning crop water use. The table below presents accumulated heat units and cotton crop evapotranspiration (ET) for the Mesonet sites listed. These data are based on a June 1st planting date, since many fields were planted around that time in 2015. Triple digit temperatures and high winds have prevailed for the past several days. For June 1 planted cotton, crop water use has averaged about 0.17 to 0.23 inches/day in southwest Oklahoma. In the Altus vicinity, June 1 planted cotton averaged 0.22 inches/day. As the crop progresses into the bloom stage, this daily water demand will increase significantly.

For June 1 planting date through July 16					
Location (elevation)	DD60 accumulation from June 1	Past 3-day accumulated ET	Past 7-day accumulated ET	Past 14-day accumulated ET	From planting accumulated ET
	heat units	---------------------------------- inches ----------------------------------			
Altus (1365 ft)	976	0.66	1.41	2.15	5.17
Tipton (1270 ft)	965	0.68	1.43	2.16	5.00
Hollis (1631 ft)	908	0.55	1.16	1.84	4.62
Erick (1978 ft)	814	0.52	1.11	1.74	4.40
Ft. Cobb (1384 ft)	904	0.63	1.30	1.89	4.60

Irrigation Accuracy Issues

Many producers have initiated irrigation. It may be necessary to check the settings provided by the manufacturer of the center pivot by placing measurement gauges in the field. This “ground truthing” may be very important. Growers believe they are applying a certain amount of water based on a specific setting, but in actuality they may not be. We have encountered some issues with this over the past several years, and some systems were substantially off calibration and delivered less water than the settings indicated. One of the most common issues is the amount of irrigation water (irrigation capacity) provided by the system (wells) may fluctuate during the growing season, and may be significantly reduced by the end. Calibrating the system for these situations can be important to fully understand and know the amount of irrigation water actually being applied. A reduction in irrigation capacity may require a re-assessment of the nozzle package and perhaps replacing nozzles with the appropriate type to ensure accuracy.

RB

Insect Update

The insect outlook is as follows: Light infestations of pests continue. Most fields will start to bloom in the next week to 10 days. Fleahopper control sprays are coming to an end. Grasshoppers are a concern on the edges of some fields but no control measures as yet have been used. Stinkbugs are present in alternate host areas. Infestations in cotton have not yet occurred but weekly scouting should continue for all pest. Preservation of beneficial arthropods becomes crucial now to curb future potential outbreaks of cotton aphids and spider mites. Moth counts are at all-time lows. This statement seems to be used every year - which is better than saying record highs.

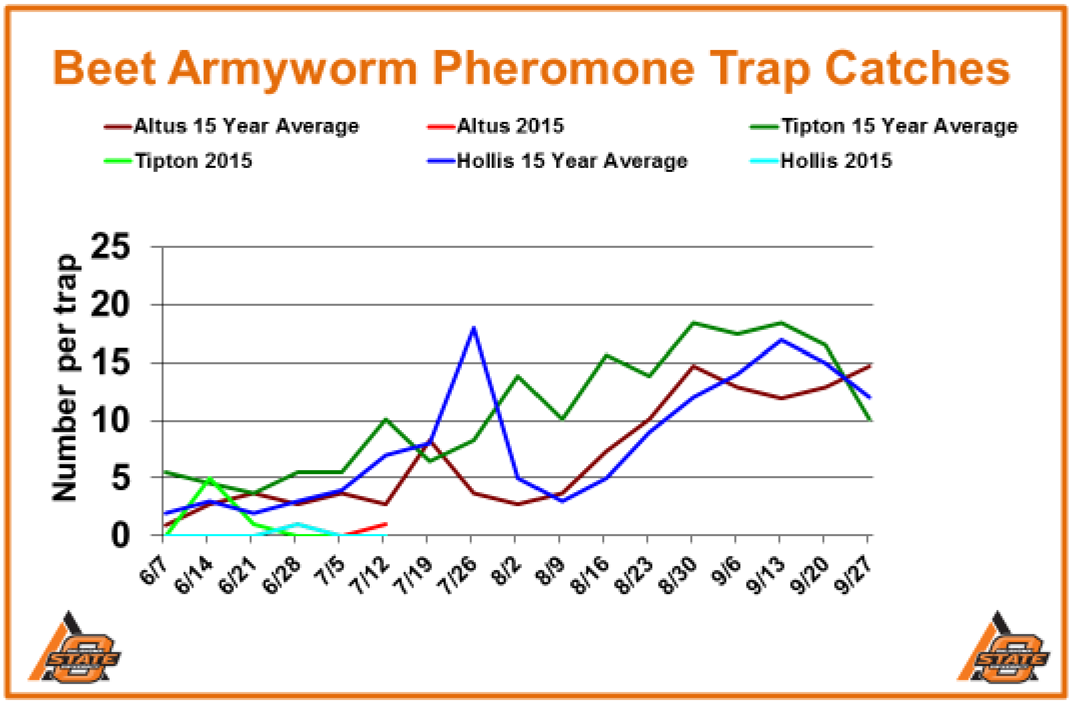
In other crop news, Sugarcane aphids in grain sorghum have been a major concern in several counties in the state since early June. Those counties include Jackson, Tillman and Caddo. No failures of control measures have been reported. For more information about this pest please contact your local county extension office or this office.

Last week's summary of surveyed counties and fields is presented below along with moth trap reports.

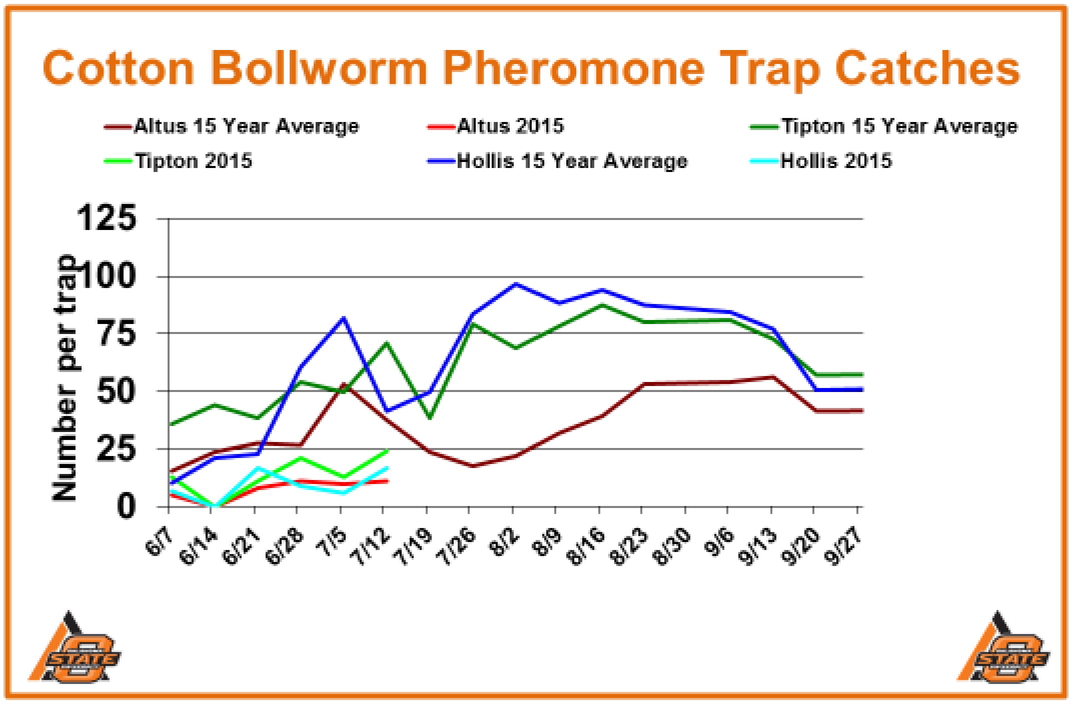
Field Surveys in Oklahoma – week ending July 17, 2015.

Location	Date of planting	Plant Stage	Insects	Comments
Beckham Irrigated RACE - Damron	June 3	Pre-bloom	None detected	Excellent
Beckham Irrigated Innovation DEMO Damron	June 3	Pre-bloom	None detected	Excellent
Blaine Irrigated XtendFlex Enhanced Variety - Schantz	June 1	Pre-bloom	None detected	Good
Blaine Irrigated Cotton Inc Enhanced Variety - Schantz	June 2	Pre-bloom	None detected	Good
Blaine Irrigated Bayer CAP - Schantz	June 1	Pre-bloom	None detected	Good
Blaine Irrigated Dow Innovation Schantz	June1	Pre-bloom	None detected	Good
Caddo Irrigated OVT – OSU Station	June 8	Variable	None detected	Good
Harmon Irrigated Cotton Inc Enhanced Variety - Cox	May 27	Pre-bloom	None detected	Good
Harmon Irrigated Bayer CAP - Horton	June 1	Match head Squares	None detected	Good
Jackson Irrigated RACE - Darby	June 2	Match head Squares	None detected	Good
Jackson Irrigated OVT - Altus Station	June 4	Variable	None detected	Good
Jackson Dryland Race - Abernathy	June 9	Match head Squares	None detected	Good
Jackson Irrigated Weed Control Trials - Altus Station	June 4	Pre-bloom	None detected	Good
Tillman Irrigated RACE - Nichols	June 3	Pre-Bloom	None detected	Excellent
Tillman Dryland RACE - Fischer	June 10	Match head Squares	None detected	Good
Tillman Dryland OVT - (Tipton Station)	June10	Variable	None detected	Good
Washita Dryland RACE - Davis	June 3	Variable	None detected	Good

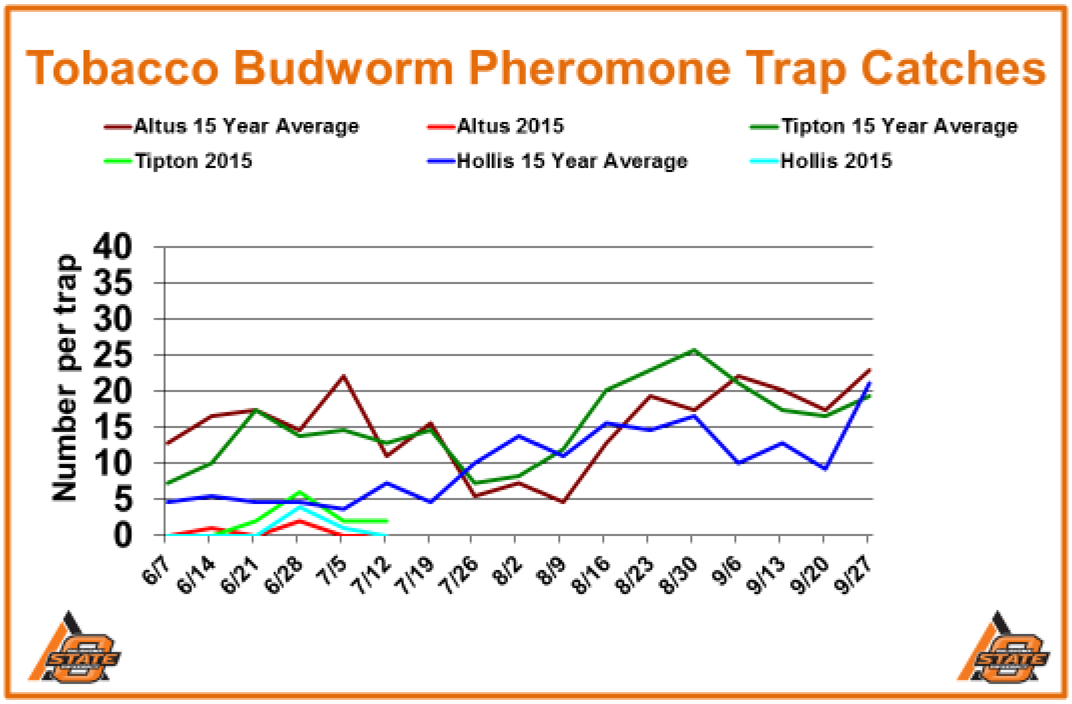
RACE – Replicated Agronomic Cotton Evaluation Trial (Oklahoma Cooperative Extension)
CAP – Cotton Agronomic Plot (Bayer CropScience)
OVT – Official Variety Trial (Oklahoma Agricultural Experiment Station, Altus, Tipton, Fort Cobb)



Beet armyworm moth



Cotton bollworm moth




Tobacco budworm moth

JG

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