



Cotton Comments

OSU Southwest Oklahoma Research and Extension Center
Altus, OK

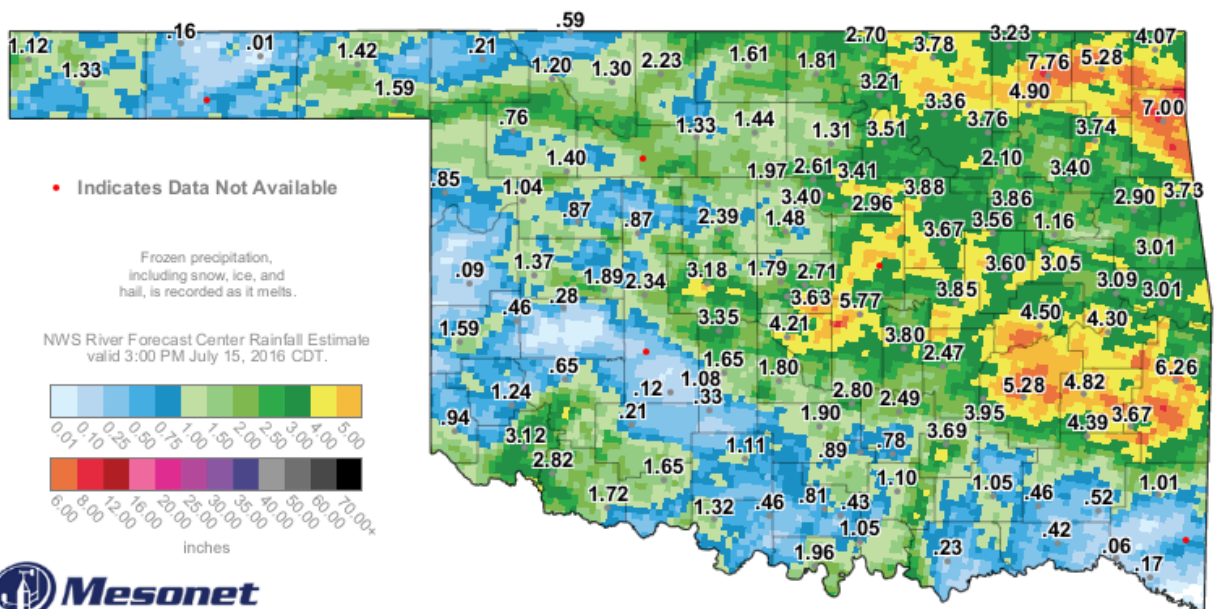


July 15, 2016

Volume 6 No. 5

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. Recently, high temperatures have been in the triple-digits. As long as we have good moisture, the 2016 crop will respond to this “cotton growing weather.” Irrigation has been initiated in some areas, including some fields in the Lugert-Altus Irrigation District. Significant rainfall amounts have been received over the past week or so. The Altus Mesonet reported about 2.5 inches on July 8th and there was some severe crop damaging hail encountered in a small area on the west side of the North Fork of the Red River. The Mesonet graphic below presents the rainfall amounts for the past two weeks.



14-Day Rainfall Accumulation (inches)

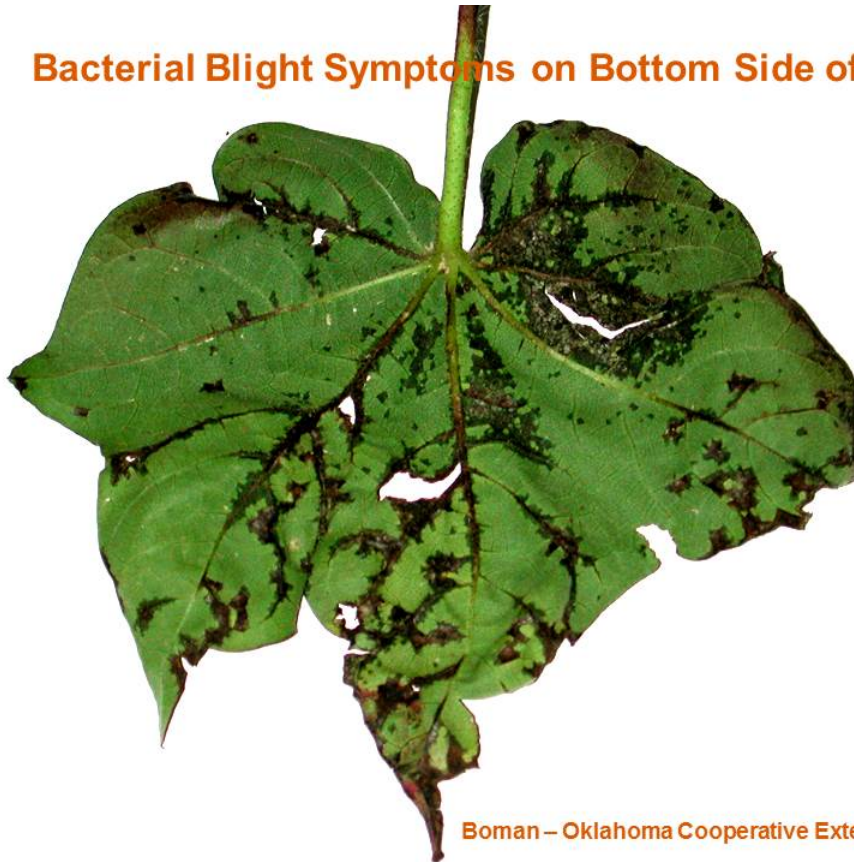
3:55 PM July 15, 2016 CDT

Created 4:00:26 PM July 15, 2016 CDT. © Copyright 2016

Bacterial Blight Observed

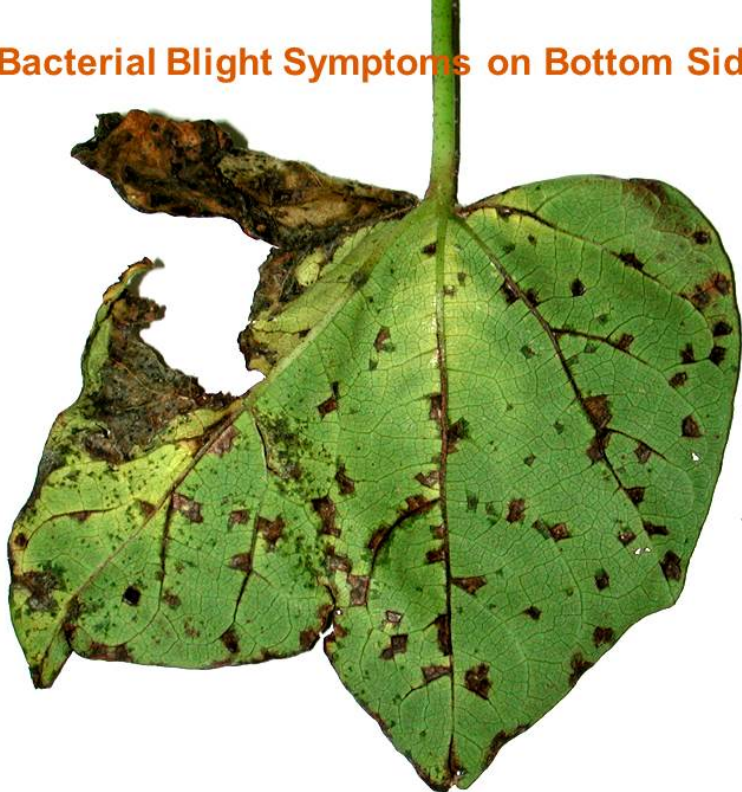
A local producer noted some lower canopy leaf shed in a field near Altus and requested assistance in identifying the problem. Field inspection indicated that a significant Bacterial blight infection was the issue. Leaf symptoms are angular, dark, shiny spots, which follow the outline of the cells, hence the name Angular Leaf Spot (when found only on foliage). Symptoms on bolls first appear as small, sunken, rounded to irregular, watery lesions. As the infection progresses, the lesions will enlarge and may blacken and look waxy. Once the carpel wall of the boll is penetrated, secondary fungi will colonize the boll. Subsequently, the lint may be discolored. If the infection is sustained for a long period of time, the boll can be completely destroyed. Because of premature defoliation and infected bolls, this disease can result in significant yield loss in susceptible varieties.

Bacterial Blight Symptoms on Bottom Side of Leaf



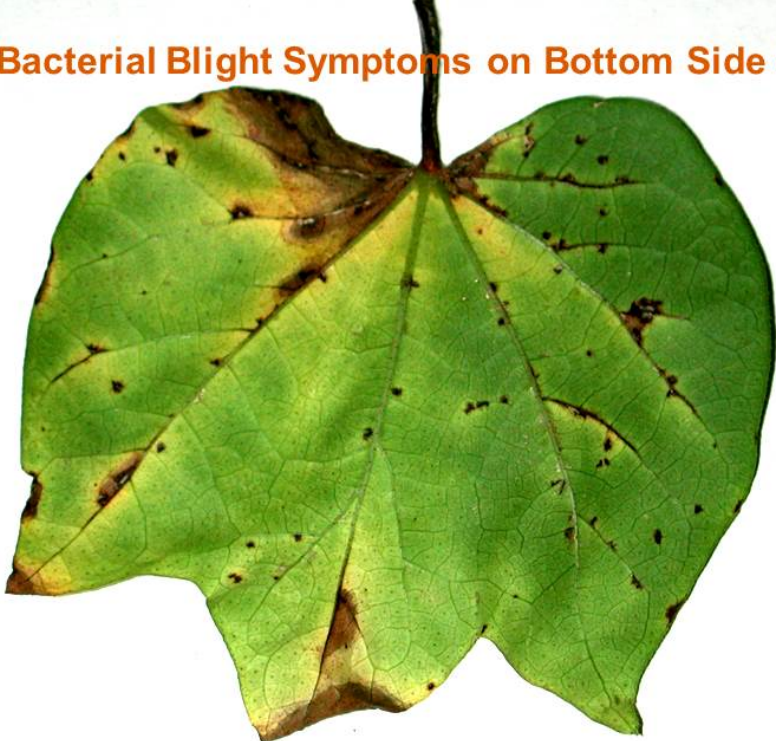
Boman – Oklahoma Cooperative Extension Service

Bacterial Blight Symptoms on Bottom Side of Leaf



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Bacterial Blight Symptoms on Bottom Side of Leaf



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Bacterial Blight Symptoms on Bottom Side of Leaf



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Bacterial Blight Symptoms on Top Side of Leaf



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Bacterial Blight Symptoms



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Bacterial Blight Symptoms On Main Stem and Leaf



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Bacterial Blight Symptoms on Boll



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Bacterial Blight Symptoms on Boll



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Bacterial Blight Symptoms on Boll



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Bacterial Blight Symptoms on Boll



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According to the Compendium of Cotton Diseases published by the American Phytopathological Society, the causal agent is a bacterium, *Xanthomonas campestris* pv malvacearum. These bacteria may originate from debris of diseased cotton plants or planting seed. Plants may get infected when bacteria from infected plants are carried by insects or when infested soil gets splashed up onto leaves, bolls or other plant parts. Bacteria may enter stomata on the leaves, or wounds caused by insects, hail, blowing sand, equipment, etc. Boll infection often results in contamination of seeds which may then carry the bacteria to the developing seedling the next year. Acid delinting of planting seed has been extremely effective to reduce the carryover to the next generation of plants.

Considerable resistance to the many races of this disease is found within different lines of upland cotton. Plant breeders have incorporated many genes into many, but not all, modern upland cotton varieties to make them highly resistant to various races of the disease. There are multiple races of Bacterial blight, and generally, in our region, Race 18 dominates. Dr. Terry Wheeler and Dr. Jason Woodward at the Texas A&M Agrilife Research and Extension Center at Lubbock have published Race 18 variety screening results. To determine what they found for variety reaction to this disease, see below:

[Click here to see variety response to Race 18](#)

Fields exhibiting symptoms should be carefully inspected. Sprinkler irrigation can potentially increase the severity of infection by moving the causal agent to uninfected areas and bolls on the plant. Generally, this disease is more of a concern when wet or humid conditions exist. **Other than genetic control through resistant or immune varieties, no effective treatments for Bacterial blight are currently available.**

If you encounter symptoms of this disease in one of your fields, please contact us.

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 bolls. 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 cutout date is known.**

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

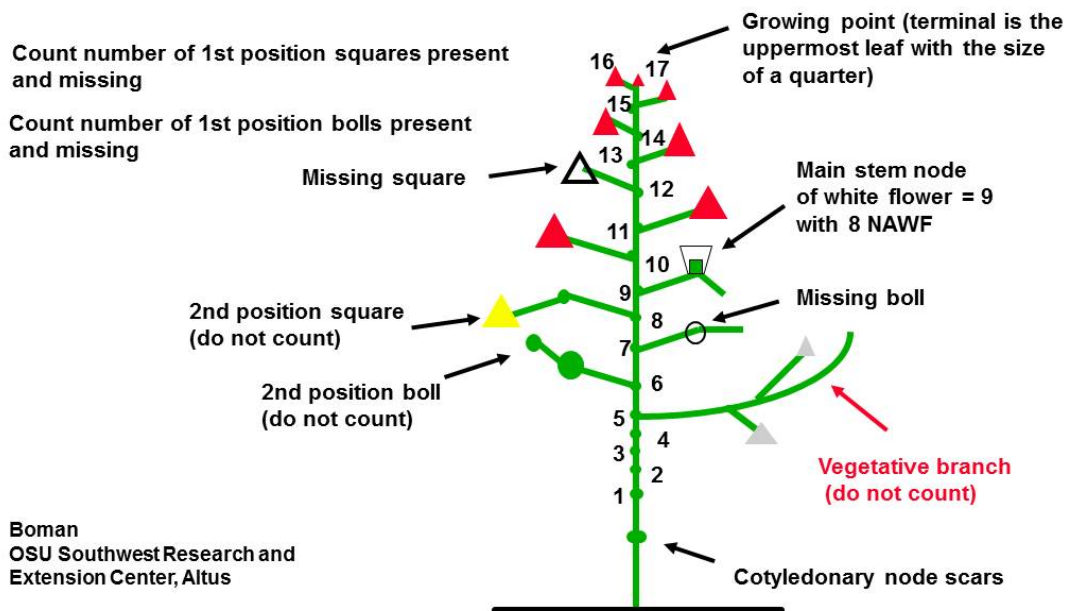
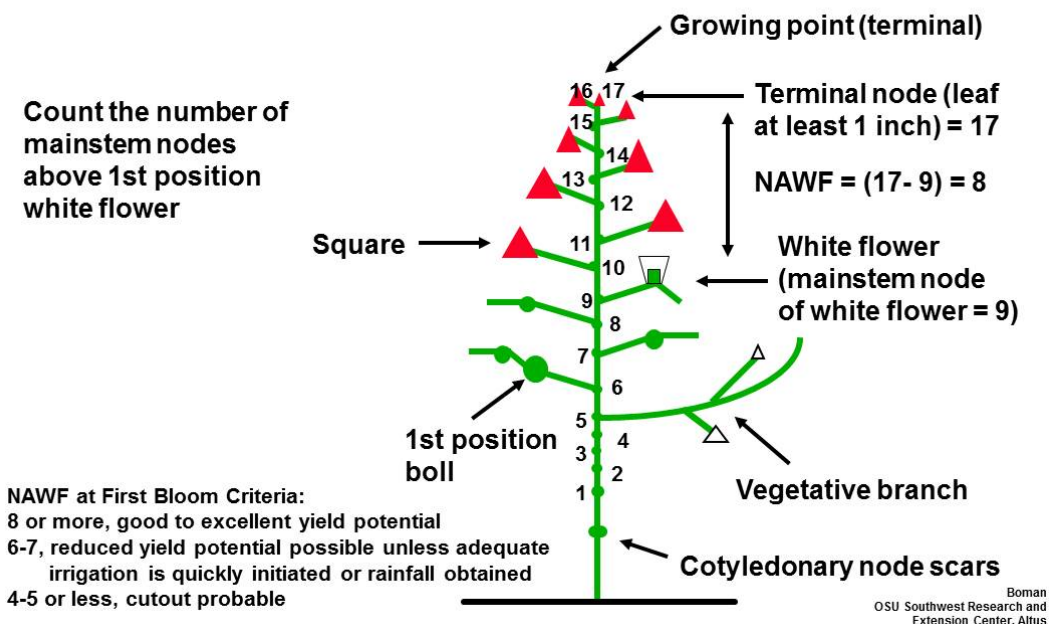


Figure 2. Nodes above white flower at early to mid-bloom.



[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.

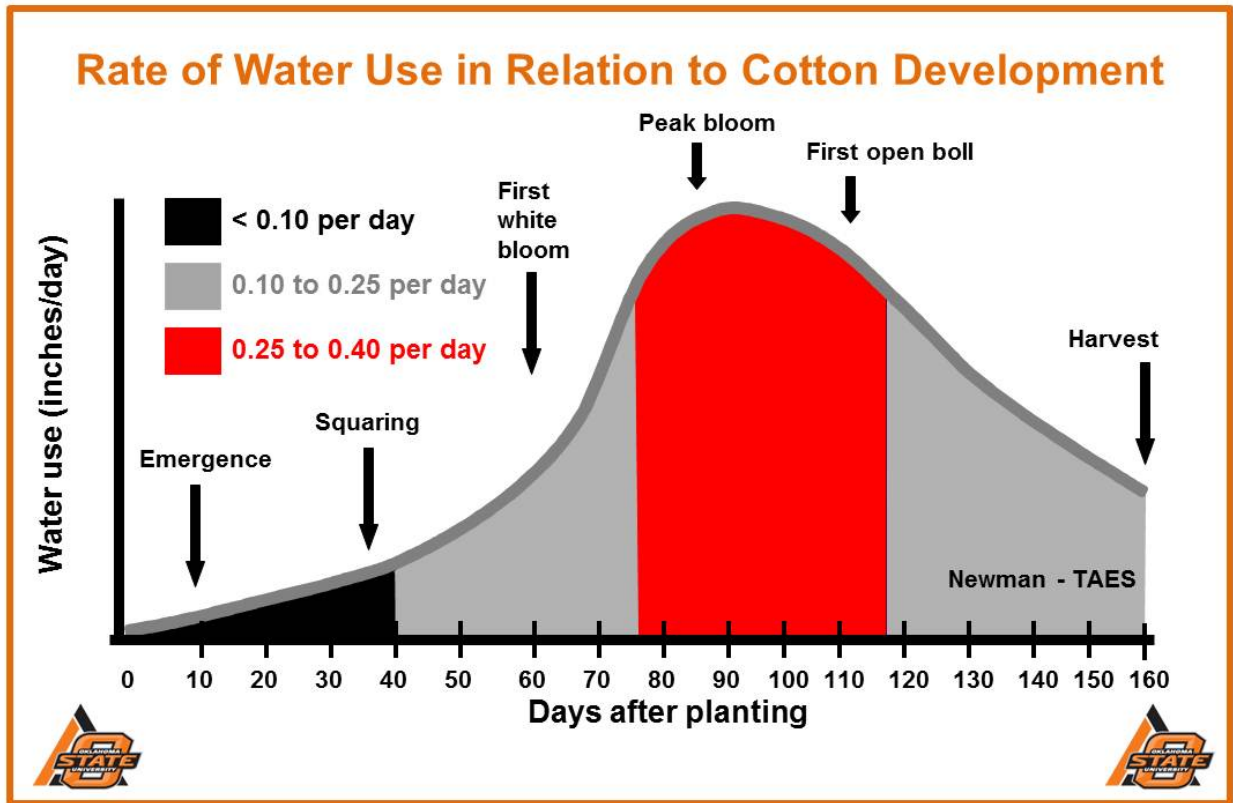
Irrigation Requirement

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 good rainfall over the past two years. 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 shallow aquifer 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](#)

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. This year, fleahopper pressure was moderate. Generally speaking, the main problems were mis-timing/delayed applications. No other pests have been reported in cotton. Weekly scouting should continue for all pests. Preservation of beneficial arthropods becomes crucial now to curb future potential outbreaks of cotton aphids and spider mites. Moth pheromone trap counts for cotton bollworms, tobacco budworms, and beet armyworms are very low.

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, Kiowa 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.

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

Field Surveys – Week Ending July 15, 2016

Location	Date of planting	Plant Stage	Insects	Comments
Blaine Irrigated Cotton Inc Enhanced Variety - Schantz	May 26	Prebloom	None Detected	Good
Blaine Irrigated Dow Innovation - Schantz	May 26	Prebloom	None Detected	Good
Caddo Irrigated OVT – OSU Caddo Research Station	May 26	Prebloom	None Detected	Good
Harmon Irrigated RACE – Cox	May 27	Prebloom	None Detected	Good
Harmon Irrigated CAP – Horton	April 28	9.5 NAWF	None Detected	Fair
Jackson Irrigated RACE – Darby	May 31	Matchhead Squares	None Detected	Fair
Jackson Irrigated PhytoGen Innovation - Darby	May 31	Matchhead Squares	None Detected	Fair
Jackson Irrigated OVT – OSU SWREC	May 27		None Detected	Fair
Jackson Dryland RACE - Abernathy	June 9	Matchhead Squares	None Detected	Good
Jackson Irrigated Cotton Inc Enhanced Variety - Abernathy	May 27	Prebloom	None Detected	Good
Jackson Irrigated PhytoGen Innovation Trial – OSU SWREC	May 31	Prebloom	None Detected	Good
Jackson Irrigated Entomology Trials – OSU SWREC	June 7	Prebloom	None Detected	Fair
Tillman Irrigated RACE – Nichols	June 6	Hail damage from July 8 storm event		
Tillman Dryland OVT – OSU Tipton Valley Research Center	June 8	Matchhead Squares	None Detected	Fair

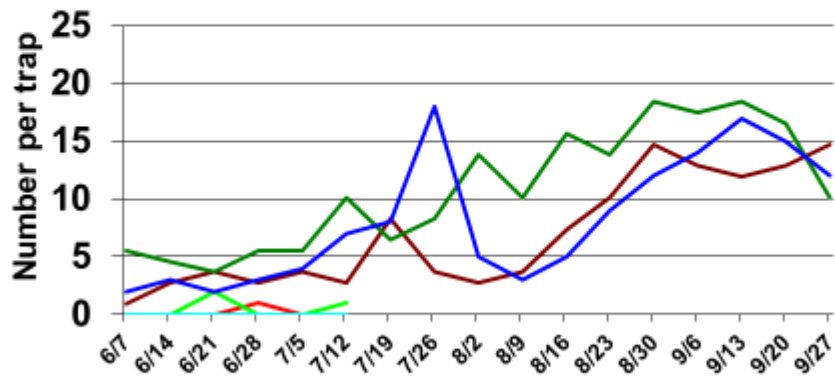
RACE – Replicated Agronomic Cotton Evaluation Trial (Oklahoma Cooperative Extension)

CAP – Cotton Agronomic Plot (Bayer CropScience)

OVT – Official Variety Trial (Oklahoma Agricultural Experiment Station, Altus, Tipton, Fort Cobb)

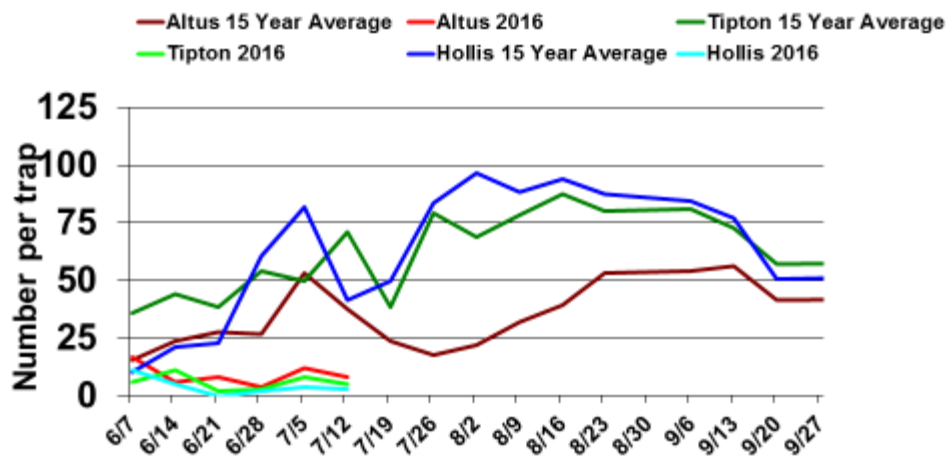
Beet Armyworm Pheromone Trap Catches

— Altus 15 Year Average — Altus 2016 — Tipton 15 Year Average
— Tipton 2016 — Hollis 15 Year Average — Hollis 201



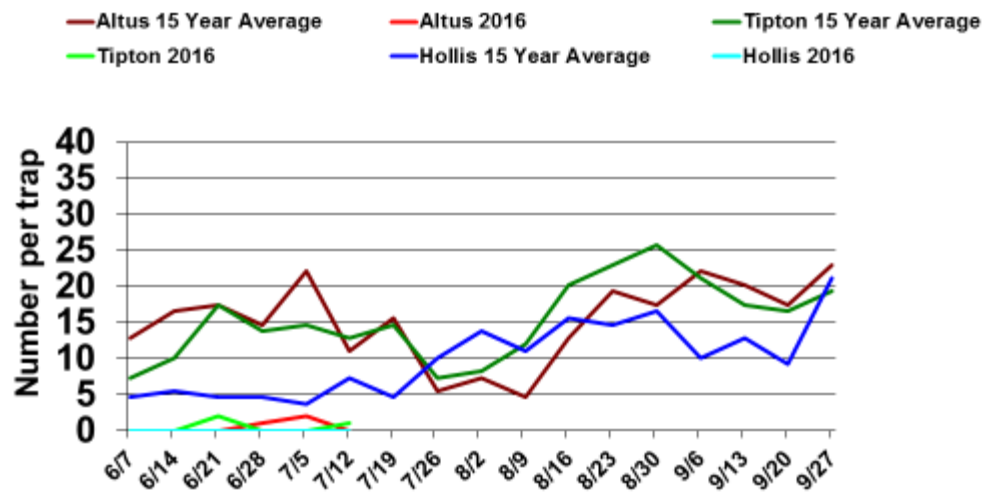
Beet armyworm moth

Cotton Bollworm Pheromone Trap Catches



Cotton bollworm moth

Tobacco Budworm Pheromone Trap Catches



Tobacco budworm moth

JG

Upcoming meetings

August 2 - Tillman County - Frederick. Please Contact Aaron Henson for further details (580) 335-2515.

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