Cotton Comments

OSU Southwest Oklahoma Research and Extension Center
Altus, OK

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Current Situation

Precipitation continues to be beneficial in much of the Oklahoma cotton area. Violent thunderstorms generating tornadoes have also been encountered. Wheat and canola continue to look good and are making excellent progress in many areas with adequate rainfall. Planting moisture is good in many fields at this time. Seed acquisition has occurred and producers are busy checking equipment for repairs in anticipation of planting soon. Earlier in the year, the National Cotton Council Planting Intentions Producer Survey estimated that Oklahoma would plant 374,000 acres (down 10% from 415,000 acres last year. More recently in March, the USDA-National Agricultural Statistics Service (USDA-NASS) projected that Oklahoma would plant 350,000 acres, down 16% from last year. Only time will tell.

Altus Mesonet rainfall from October 1, 2011 through April 18, 2012 totaled 11.58 inches, compared to the Altus “Normal” (1971-2000) of 11.78”. From January 1 through April 18, we are about 89% of Normal with 5.69” compared to 6.37” for the Normal. As I mentioned in the last newsletter, we have come a long way since last year with near normal precipitation. We have some good chances of additional rainfall in the area soon based on the forecast. The main caveat is that the North Fork watershed still has not delivered much inflow into Lake Altus and it is about 22% of capacity at this time. This has significant implications for production for the Lugert-Altus Irrigation District. To monitor this situation, a website is available. To access this website, click here:

Click here for Lake Altus

Based on results from a long-term irrigated date of planting study conducted at the OSU Southwest Research and Extension Center, the window producing the highest yield opens around May 10 and begins to close during the last week of May. Of course, an individual year’s results can vary. With May just around the corner, and air and soil temperatures climbing, many producers are gearing up for planting. Rainfall may affect producer plans and possibly lower soil temperatures, but as of this writing, the Altus (www.weather.com) 10-day forecast indicates that beginning Sunday, April 22, highs could be in the low to mid-80s with lows in the mid 50s to low 60s. Although this is earlier than the maximum yield window for irrigated cotton at Altus discussed above, if this forecast holds up, we should see 70 plus cotton DD60 heat units from Monday April 23 through Saturday April 28.

Soil Temperatures

Based on the Altus Mesonet station data, over the last 120 hours (5 day), the 4” depth bare soil temperatures have been cycling about 15 degrees per day from lows in the low 50s to highs in the low to mid-70s. The 4” depth bare soil temperature high temperature average for the last 3 days has been 75 degrees, and the low 63. The overall soil temperature average for the last 3 days has been 69 degrees.

The Hollis Mesonet site is not indicating these same temperatures. Over the last 120 hours (5 day), the 4” depth bare soil temperatures have been cycling about 20 degrees per day from lows in the mid 50s to highs ranging from 66 to 76. The 4” depth bare soil temperature high temperature average for the last 3 days has been 74 degrees, and the low 60. The overall soil temperature average for the last 3 days has been 67 degrees.

Dry soils will warm up faster than moist soils. Since we continue to have roller coaster air temperatures, when we do get rainfall the soil temperatures will then be lower. It is a good idea to have your own soil thermometer so you can check your own specific field situation.

To see the state map of 3-day average 4-inch bare soil temperatures, go to:

Click here for 3-day average soil temperatures

To see the state map of current 4-inch bare soil temperatures, go to, then click on Soil Temperature and select 4-inch Bare Soil Temp:

Click here for current soil temperatures

To see a graph of soil temperatures for a specific Mesonet site, go to:

Click here for soil temperature graph

then click on: Soil Temperature

then look for Graphs, and click on All Depths Soil Temp Graph

then select the appropriate Mesonet station from the drop-down menu at the top, then select the time period (Hours) for which you wish to see the graph. I suggest that you select the 120-Hour (or 5 day) graph.

Note that the 5 cm soil depth is equivalent to 2 inches, and the 10 cm depth is equivalent to 4 inches.

A total of 4 lines will be generated. The legend for the graph is on the far right. You can un-select the Sod Temperatures for both the 5 and 10 cm depths, and Bare Soil temperature at the 5 cm depth by right-clicking while over the icon, then select Hide. Once you have gone through this procedure, you will be able to see the 4-inch depth Bare Soil record for the time period and Mesonet station which you have selected.

Successful Planting Strategy

The single most important issue to recognize is that cotton seedlings can be damaged by cool, wet soils. Although soil temperatures are high now, we will likely see them drop, especially if precipitation is obtained and a cold front pushes through the region. Best management practices for cotton planting under normal soil moisture conditions would be to delay planting until:

1) The 3-day Mesonet average soil temperatures at the 4" depth are at least 65 degrees

2) The 5-day forecast calls for dry weather and a minimum of 25-50 DD60 heat units. The normal calculation for cotton DD60 heat units is:

   ((maximum air temperature + minimum air temperature)/2) - 60

   Essentially, the average air temperature for the day is determined and the 60 degree developmental threshold for cotton is subtracted. The DD60s for each day are then totaled. If you have faith in your local forecast, then the projected high and low for the following several days can be used to calculate DD60s.

3) Low temperatures are forecast to remain above 50 degrees for the 5 days following planting.

If we recognize that equipment constraints and large acreages generally require producers to plant during less than optimum conditions, they should realize that seed quality and seeding rate become very important. The seeding rate can be adjusted on the planter. However, with transgenic seed prices and technology fees being expensive, increasing seeding rate is not a palatable option for most producers. Therefore, seed quality becomes very important.

The Texas Cool Germination test was developed to specifically test cotton seed under cool soil temperature conditions. This germination data is NOT required on the state seed tag. The state seed tag indicates Standard Germination data and is performed in a different manner. It is usually guaranteed on the seed tag at a minimum of 80%. Texas Cool Test data are obtained from a test conducted at 64 degrees F with seedlings counted after 7 days. The Texas Cool Test data may be obtained from most seed companies upon request. Higher Cool Test data indicate higher vigor under

temperature stressed conditions. If the Cool Test data for a specific lot of cotton seed is known, then potentially more vigorous seed lots can be identified. This can be used to determine the planting sequence and possible planting date. Producers should begin planting with higher vigor seed under cooler temperatures, and finish up with lower vigor seed under warmer temperatures. Planting conditions for rapid germination and emergence include:

1) high quality seed with good to excellent Cool Germination Test data (>60%)

2) a favorable 5-day forecast

3) minimum air temperature of at least 50 degrees

4) maximum air temperature ~80 degrees

5) plant into a firm, moist seedbed 1-2 knuckles deep

6) proper and uniform seeding rate of no more than 4-5 seeds per foot in 40-inch rows.

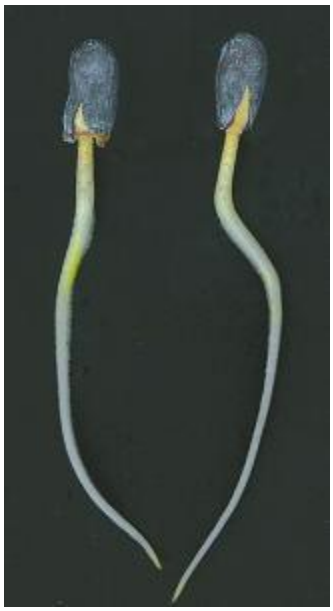
Imbibitional Chilling Injury

This injury occurs when cotton seed is subjected to cold conditions during the first 2-3 days after planting, or during the period of time when the seed is imbibing moisture from the surrounding soil. Cotton seed contains lipids which must be converted to energy during germination. The cell membranes must properly develop. Soil temperatures around the seed of 50 degrees F or below can damage seedlings during this time. Soil temperatures of 41 degrees F or less may kill or severely injure the seedling.

The three seedlings below were subjected to chilling temperatures during the imbibition phase. During the first six hours of imbibition, the damaged seedlings were exposed to a temperature of 40 degrees F. After the chilling period they were moved to a chamber set at 86 degrees F for two to four days. The curling, shortening and thickening of the roots are typical of imbibitional chilling injury. The chilling during this phase of imbibition injures and typically kills the root tip meristematic tissue. This results in cessation of normal taproot growth. Subsequently, lateral roots develop to compensate for this loss. Typically these seedlings may survive and produce productive plants if additional stresses such as water deficit or disease are not encountered.

Cotton seedlings exhibiting chilling injury

The two seedlings below show normal root development. When the two groups are compared it may be noted that seedlings injured by chilling are often short with thickened hypocotyls and radicles, dead root tips, and show some signs of lateral root growth.



Normal cotton seedlings

Seeding Rate

Stand components consist of both uniformity and density. Uniformity of planting seed in the row is affected by planter type. The newer vacuum planters are extremely effective at controlling vertical distribution of the seed in the seed furrow and horizontal spacing down the row. These modern planters typically provide excellent seed to soil contact capability, which provides an increased likelihood of an individual planted seed being able to germinate. Seeding rate or density is controlled by producer. The newer vacuum planters coupled with the generally higher seed quality today than what we many times encountered in the past, have allowed most producers to successfully

reduce seeding rates. However, because of the cost of transgenic varieties in addition to cost of insecticide seed treatments, many producers are pushing the agronomic minimum and living on the edge, with little margin for error, so to speak. Many seeding rate trials have been conducted in southwestern Oklahoma and the Rolling and High Plains regions of Texas over the last several years. Results all point to the fact that seeding rates can be pushed to a lower level than what was generally accepted 10-15 years ago, however, the producer must have extreme faith in his planter, field-specific planting situation, seed quality, and environmental conditions after planting. It is difficult to agronomically justify less than 2 seed/row-ft as a best management practice in dryland cotton production.

Cotton has a remarkable capacity to compensate yield across a fairly wide range of plant populations. Recent seeding rate studies have indicated that within the FINAL plant stand range of 1.5 to 4.5 plants per row-ft. in 40-inch rows, lint yield can remain reasonably unaffected. However, how a producer gets from a seed drop rate to a final plant stand can be a treacherous journey. Assuming that good soil conditions are present, an excellent vacuum planter is used to control seed distribution both down the row and in planting depth, a range of 2-4 seed per row-ft. in 40-inch rows is probably acceptable. Under dryland conditions, the low end may be targeted. If poor planting conditions (such as low seed quality, marginal soil moisture in the seeding zone, a large amount of crop residue which may affect seed to soil contact, lack of precision planting equipment, or poor forecast conditions) exist, it may be more important to increase the seeding rate. If a low seeding rate is used, the producer must have high confidence in the seed quality and planter precision.

Cotton Root Disorder Guide

A guide to cotton root disorders was published several years ago by Cotton Incorporated. This publication was generated by several workers across the Cotton Belt. Cotton root disorders detailed in the publication include: herbicide injury from amino acid synthesis inhibitors, photosynthetic inhibitors, and seedling growth inhibitors; pathogens including fungi and nematodes; fertilizer injury; chilling injury; and soil compaction.

The guide is available on the Web at:

Click here for online Cotton Root Disorder Guide

2011 Texas Cotton Resource DVD Available at No Charge

For those who may have missed this in the last issue, several years ago I was part of a team at Texas A&M that developed and distributed the 2005 Cotton Resource CD. This CD contained hundreds of publications related to cotton production and management and was funded by a grant from the Texas State Support Committee – Cotton

Incorporated. Publications ranged from the Cotton Physiology Today Newsletters (developed by the National Cotton Council's Cotton Physiology Education Program) to various numbered publications and handouts developed by cotton scientists and Extension specialists from across the Cotton Belt. In 2007 we upgraded this publication to a data DVD format which included several videos. It should be noted that the data DVD format is not the same as a movie DVD format. These data DVDs will NOT "play" in most DVD players. Using a computer one can access the menu (in a web browser such as Internet Explorer) which was generated using HTML programming. It will "run" on computers with DVD drives.

Dr. Gaylon Morgan, State Extension Cotton Specialist at Texas A&M recently released the 2011 update. All persons involved in the cotton industry could benefit from having a copy of this DVD. Over the years several thousand have been distributed, and thanks to a grant from the Oklahoma State Support Committee - Cotton Incorporated, we were able to purchase 500 copies for our state. Although some differences exist between production regions in Texas and Oklahoma, the general information should be of value to Oklahoma producers. If publications exist which provide local and specific information for Oklahoma, those should be used. The sections covered by the Texas 2011 Cotton Resource DVD include: General Production; Seed and Feed; Decision Aids; Irrigation; Fertility; Insects; Weeds; Nematodes & Disease; Harvest, Fiber Quality & Ginning; Ag Economics; Kids' Educational Materials; Internet Resources; Photo Gallery, and Videos. Of extreme value are photos, publications, and some videos dealing with insect, weed, and irrigation management.

Although no longer being published and now somewhat dated, the entire Cotton Physiology Today Newsletter archive is also available on the DVD. These newsletters provide generally still relevant and useful information which is categorized by various topics. These include: Growth and Development; Soil Management, Tillage and Rotation; Variety Selection and Planting Decisions; Fertility; Pest Management; Plant Physiology; Plant Mapping, Monitoring and Interpretation; Use of Plant Growth Regulators; Crop Management; Defoliation; Fiber Quality and Contamination; Miscellaneous Publications, and Year End Reviews.

If you would like to receive a free copy of this DVD, please contact Ronna Parker at the OSU Southwest Research and Extension Center at 580-482-2120, or via email at ronna.parker@okstate.edu. We will get these out as soon as possible. Also, since these are educational DVDs the open policy has always been for those who have them to make copies and distribute to others who may have an interest.

The contents of the DVD have been posted on the Department of Soil and Crop Sciences website at Texas A&M University. One can use the same HTML interface developed for the DVD, and download publications directly from this server.

Click here for the Texas A&M Website Hosting the 2011 Cotton Resource DVD

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Please give credit to this newsletter if any information is reproduced or incorporated in any other communications. Thank you.

Editors

Randy Boman

Jerry Goodson

SEND US A COMMENT BY EMAIL

Contributing Authors

Randy Boman

Newsletter in maintained by Jerry Goodson Extension Assistant.

If you would like to added to be added to the direct mailing please email me at

jerry.goodson@okstate.edu

Randy Boman
Research Director and Cotton Extension Program Leader
16721 US Hwy. 283
Altus, Oklahoma
(580) 482-2120 office
(580) 482-0208 fax
(580) 481-4050 mobile

randy.boman@okstate.edu

www.osucotton.com

www.ntokcotton.org