Cotton Comments

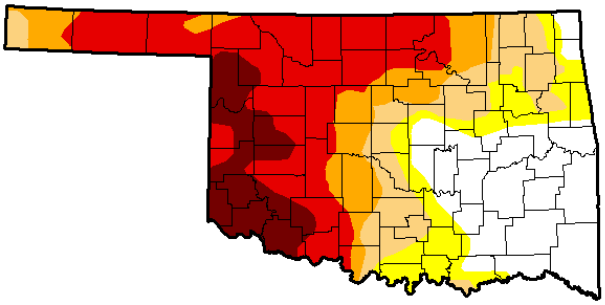
OSU Southwest Oklahoma Research and Extension Center
Altus, OK

April 21, 2015 Volume 5 No. 2

Current Situation

Drought continues to dominate the thinking in the far southwestern corner of the state. The April 14 Drought Monitor graphic below indicates that a substantial portion of western Oklahoma was still under significant drought.

U.S. Drought Monitor
Oklahoma



April 14, 2015
(Released Thursday, Apr. 16, 2015)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	23.52	76.48	65.21	51.65	39.72	10.73
Last Week 4/7/2015	16.76	83.24	68.27	52.74	39.72	11.60
3 Months Ago 1/13/2015	29.59	70.41	59.12	42.59	22.58	5.69
Start of Calendar Year 12/30/2014	25.63	74.37	62.03	40.84	21.74	5.70
Start of Water Year 9/30/2014	8.55	91.45	73.31	58.13	20.92	4.64
One Year Ago 4/15/2014	6.73	93.27	78.95	54.81	26.51	13.71

Intensity:
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought

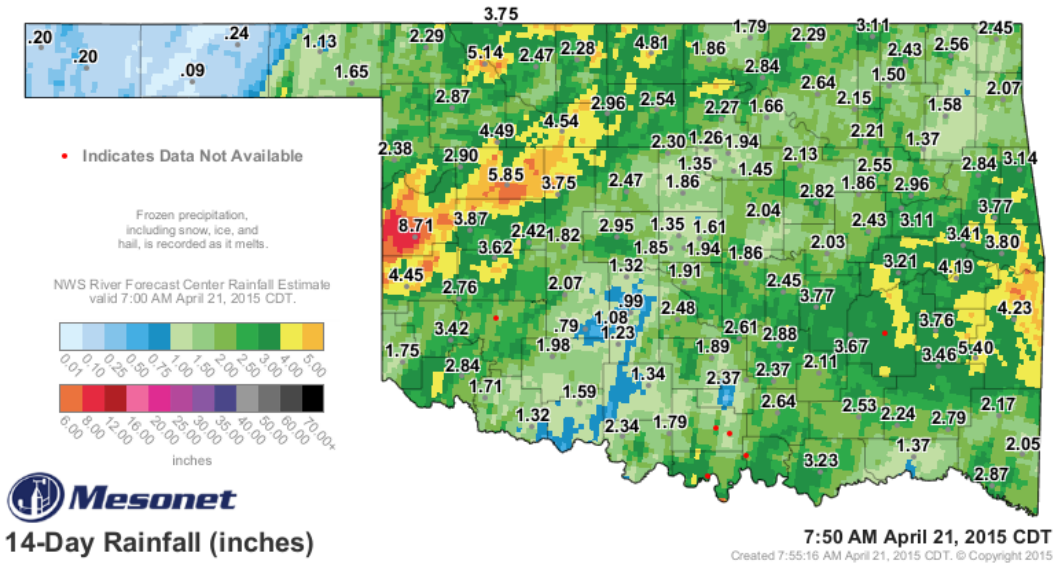
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Michael Brewer
NCDC/NOAA

http://droughtmonitor.unl.edu/

Late April rainfall leading up to planting season has been great. Although recent rainfall and weather patterns have been favorable (more so in some counties), a significant moisture deficit continues to plague some parts of the state. We are still substantially below our needs with respect to runoff necessary for reservoirs. Until just recently, the region west of a line from about Altus to Ponca City was struggling with a dire moisture situation. Rainfall amounts over the past several days have certainly been very

beneficial in some areas (see 30 or 14-Day Rainfall Accumulation Mesonet graphic below).



Reminder Concerning Bollgard II© XtendFlex™ Varieties in 2015

New for 2015 are varieties with Bollgard II© caterpillar insect protection stacked with XtendFlex™ (triple-stacked for dicamba, glyphosate, and glufosinate herbicide tolerance). The XtendFlex™ technology was approved in January, but the new low-volatility dicamba herbicide formulations have not yet been approved by EPA. However, the XtendFlex™ technology containing varieties are still going to be sold in 2015, but no in-season dicamba applications will be allowed. Each bag of XtendFlex™ cotton seed will have a pink label stating:

"Notice: Do not apply dicamba herbicide in-crop to Bollgard II© XtendFlex™ cotton in 2015. It is a violation of federal and state law to make an in-crop application of any dicamba herbicide on Bollgard II© XtendFlex™ cotton unless the product label specifically authorizes that use. You should not make and Monsanto does not authorize making an in-crop application of any dicamba herbicide to Bollgard II© XtendFlex™ cotton in 2015. Refer to the Monsanto Technology Use Guide for details and recommendations on using approved Roundup© and Liberty© branded agricultural herbicides on Bollgard II© XtendFlex™ cotton."

Several seed companies will sell limited amounts of Bollgard II© XtendFlex™ varieties that have a fit for our region. These companies include Deltapine, Dyna-Gro, and Americot/NexGen. Two regulated XtendFlex™ germplasm trials were conducted at the

Caddo Research Station near Fort Cobb in 2014. Standard Bollgard II Roundup Ready Flex entries were compared to various XtendFlex™ germplasm lines, some of which will be sold in 2015. The report for these trials can be found by clicking here.

Successful Planting Strategy

Next to variety selection, most likely the next very important decision a producer makes is when to plant. The single most important issue to recognize is that cotton seedlings can be damaged by cool, wet soils. Depending upon the region of the U.S., many producers typically begin planting based the calendar date. However, the long-term optimum planting window for most states is determined based on field trials and average soil temperatures. Although soil temperatures can sometimes be high outside of this window, many times they can drop, especially if precipitation is obtained and a cold front pushes through the region.

The optimum temperature for cotton germination is near 85 degrees F. Cooler temperatures can lead to poor stands or stand failures if the correct conditions align. Under cool temperatures the physiological processes involved in germination can be very slow which can in turn result in slow growth and perhaps increased susceptibility to various pathogens.

It is suggested that planting be delayed until 1) mid-morning temperatures in the rooting zone exceed 60 degrees F at a 6-inch planting depth, and 68 degrees F at the 2-inch depth; 2) the five-day forecast indicates dry conditions and at least 25 DD60 heat units; and 3) the five-day forecast projects low temperatures above 50 degrees F.

The standard calculation for cotton DD60 heat units is:

((maximum air temperature, F + minimum air temperature, F) / 2) - 60 = DD60 heat units

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

Table 1. The outlook for planting for various five-day forecast predictive DD60 accumulations.

Predictive DD60 Accumulation for Five Days Following Planting	Outlook for Planting
<10	Very poor
11-15	Poor
16-25	Marginal
26-50	Good
>51	Very good

Source: To download Cotton Physiology Today, Planting and Replanting Decisions, April, 2007 click here.

If it is recognized 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 the 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, but many seed companies will provide this information if asked. The state seed tag reports Standard Germination data and it 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. 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 F, and maximum air temperature of at least 80 degrees
4) plant into a firm, moist seedbed 1-2 inches deep

Imbibitional Chilling Injury

Cool temperatures can adversely affect cotton seedlings. If excessively cool temperatures are encountered during the seed hydration phase, imbibitional chilling injury may occur. Imbibitional chilling 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. If seeds imbibe cool water too rapidly, embryo cells may be injured or killed due to membrane disruption. Cotton seed contains lipids which must be converted to energy during germination. The cell membranes must properly develop. Cool temperatures can also result in overall slowing of the metabolic processes during germination. Soil temperatures of 50 degrees F or below around the seed can damage seedlings during this time. Soil temperatures near 40 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

Mesonet Soil Temperatures

Soil temperatures for cotton planting are very important and the Oklahoma Mesonet provides valuable information. It should be noted that the Mesonet 5-cm soil depth is equivalent to 2 inches, and the 10-cm depth is equivalent to 4 inches. Dry soils will warm up faster than moist soils. 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:
Mesonet 3-day 4-inch bare soil temperature map

To see the state map of current 4-inch bare soil temperatures, click here:
Mesonet Current 4-inch bare soil temperature map

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 results in 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 premium insecticide/fungicide/nematicide 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 and its adjustment, field-specific planting situation, seed quality, and environmental conditions after planting. It is difficult to agronomically justify less than 2 seeds/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, and 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.

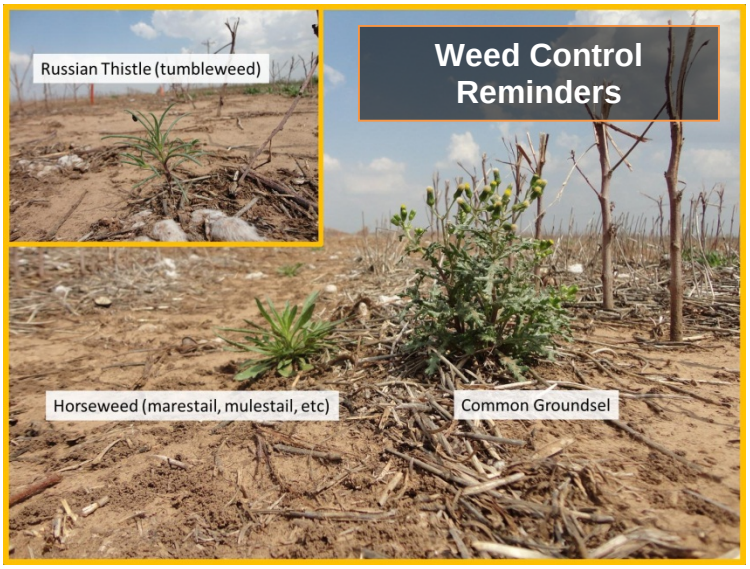
Reminder Concerning 2015 Texas A&M AgriLife Extension Profitability Spreadsheet

An Excel spreadsheet has been developed by Extension agricultural economist Dr. Jackie Smith at the Lubbock Center. See: http://agrilife.org/southplainsprofit/

The spreadsheet allows the users to select various crops and input their operation's data. This spreadsheet covers a multitude of summer crops including alfalfa, corn, corn silage, cotton, grain sorghum, sorghum silage, peanuts, sesame, sunflowers, etc. The user can enter prices, input costs, etc and calculate potential returns.

RB

Weed Control Update



Burning down weeds ahead of planting is an essential step towards a healthy, vigorous stand of cotton. Several studies have shown that weed competition early in the cotton plant's life can significantly reduce yields. Starting clean is essential. Spring weed control ahead of cotton in Oklahoma often involves several weed species. Some of the more difficult species to control are horseweed (marestail), Russian thistle, common groundsel and morningglory. With respect to horseweed, dicamba and 2,4-D are usually key ingredients in the recipe for success as long as the application time (date) allows for the proper cotton plant back restrictions to be observed (the dicamba label states that for 0.25 lb a.i./acre, 21 days must pass after receiving one inch of rainfall or sprinkler irrigation following applications; for 1 lb a.i./acre of 2,4-D, planting may occur 30 days after application).

As we get closer (≤21 Days Before Planting or DBP) to planting our herbicide options change. Despite growing weed resistance issues, many Oklahoma producers still have the mindset to shift into a "glyphosate only" mode when addressing weed issues within this period. Although this route may have been an effective option in the past, widespread difficulties experienced in 2014 should be leading most to consider other options. Starting and staying clean will completely depend on the effectiveness of your at-plant burndown operation. Finding out that your burndown treatment didn't work after your cotton emerges is a situation we want to avoid. Therefore growers need to be

considering different burndown chemistry closer to or at planting. For postemergence burndown activity within this timeframe, Gramoxone, Aim and Liberty are three non-selective options that can do a great job depending on your circumstances, and they all tankmix with residuals (like Prowl H20, Dual, or Warrant). All three are contact herbicides that are extremely dependent on good coverage. Likewise, all three product labels recommend more water than most growers are used to using (10-20 gallons per acre…read labels closely) and medium spray droplets to deliver sufficient coverage to weeds.

Two glyphosate resistant species are often present at planting, these are horseweed (marestail) and palmer amaranth (pigweed). If horseweed is still a concern close to or at planting there are a few options during this period. Since glyphosate resistant horseweed has been confirmed in many locations (most cotton producing counties) across Oklahoma the glyphosate option is out. Typically by this time of year horseweed has bolted and becomes very difficult to control. Gramoxone is one of the few options available to producers to effectively deal with this problem at planting. Another key (in addition to good coverage) for Gramoxone's success is getting the rate correct for the weed size. Although 0.5 lb ai/A typically does a great job on moderately sized (8-10 inch) Russian thistle (tumbleweed), controlling horseweed at this time typically requires a more aggressive approach. For horseweed that has already bolted I recommend 0.75 lb ai/A. Don't be surprised if larger horseweeds (> 8-10 inches in height) require a sequential application 7-14 days later for good control. Gramoxone will also do a good job on small pigweeds (≤ 6 inches). It has also been recognized that paraquat (Gramoxone) typically works better with a ¼ - ½ % (v/v) non-ionic surfactant as opposed to crop oil. Also, I have seen good control of several other broadleaf weeds (various mustards, redstem filaree, common groundsel, etc.) when tank-mixing paraquat with FirstShot SG. FirstShot SG can be applied 14-21 days before planting no-till cotton (similar to Valor) and offers an additional mode of action (It's a group 2 herbicide). I also want to remind growers that utilizing different modes-of-action (herbicide groups) is highly recommended for preventing the spread of glyphosate resistant weeds.

When trying to burn down morningglory adding 1 oz/A of Aim 2 EC plus 1% crop oil concentrate to your full rate (size dependent) of glyphosate greatly improves control. In addition, this application can also be effective on small palmer amaranth (≤ 4 inches) when the Aim rate is increased to 1.6 oz/A (according to the label). As noted above, Aim is a contact herbicide therefore good results require good coverage. It's also important to note that Aim is a group 14 herbicide providing an alternate mode-of-action (herbicide resistance issues). Consult the label for specifics.

An additional option for weed control prior to planting and on into the season is Liberty. Utilizing this chemistry when possible allows for a deviation from the usual glyphosate only routine. Liberty is a non-selective, group 10, contact herbicide. As with previously mentioned contact herbicides there are application specifics that contribute to the success of its use. Consult the label. It may be used ahead of planting for burndown purposes (and can be effective for morningglory). It may also be used over-the-top in-season if your cotton variety contains the Liberty Link trait. Currently Bayer

CropScience offers cotton varieties containing this trait alone or in combination with the glyphosate tolerance (GlyTol trait). The combination of both glyphosate (Roundup) and glufosinate (Liberty) herbicide tolerance allows for flexibility when attempting to control weeds with over-the-top broadcast applications. Glufosinate based weed control programs (utilizing Liberty herbicide technology) have been very important in the fight against resistant weeds in the Southeast and/or Midsouth. In fact, many growers from those regions won't plant a variety without tolerance of Liberty herbicide. In the Southwest, we are now seeing the spread of glyphosate resistant weeds and our adoption of the Liberty Link technology has not been anywhere near that of the highly publicized Southeast. Growers in the Southwest interested in utilizing varieties with these dual herbicide traits (Roundup and Liberty tolerance) definitely stand to benefit from the flexibility and resistance management aspect of the system. However, in this region we need to be aware of some differences that exist between Southwest Oklahoma and Georgia or Tennessee as it relates to the use of Liberty herbicide. Here in the Southwest, Liberty has been very effective for the control of morningglory in cotton, which is an occasional weakness of the glyphosate tolerant (Glytol or Roundup Ready Flex) systems. In addition, with our low humidity and high temperatures Liberty has proven less effective on pigweed as compared to glyphosate. Together these two systems can be very complimentary and allow us to address resistance management concerns at the same time. If considering this route there are some things to note. For effective season-long pigweed control it is highly recommended to include multiple residuals in your weed control program regardless of which herbicide trait or technology you buy.

The following suggestions apply regardless of the herbicide technology planted (Roundup Ready Flex, GlyTol, Liberty Link, or Glytol+Liberty Link). In my opinion a yellow herbicide is mandatory. It should also be noted that yellow herbicides provide absolutely no burndown or postemergence activity on weeds already emerged. In many cases where substantial residue is present, growers may fail to notice small weeds that have already emerged prior to the application of a yellow herbicide. Without an effective postemergence herbicide in the tank with the Prowl H20 (works best with residue) these weeds will continue to grow after application becoming more visible as they outgrow the residue, and leading the grower to believe that the Prowl H20 provided no benefit. Thorough scouting before application can eliminate this frequent scenario. Controlling these weeds early is very important. Also, tank-mixing (Warrant, Dual II Magnum, Staple, etc.) at early postemergence is also highly recommended. In the Southwest when we do receive adequate rainfall it is usually in the early part of the season (typically from spring on into June). In order for residual herbicides to be effective one of the following three requirements must be met - rainfall, irrigation or shallow tillage. Taking advantage of the rainfall component is critical. In our region it's important to plan on getting residuals out early-season, when we still have good chances to receive the activating rains. Once we get into July, our chances of getting the benefit out of a residual herbicide (without the use of a sprinkler) are much less. An effective defense against resistant weeds starts with early-season residuals.

In closing, glyphosate is still very valuable technology because it is still effective on many other weed species. Stewardship now will help sustain that value for the future. The information provided within this newsletter or on our website is not intended to replace or substitute for any product labeling. Read and follow all product labels.

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