



Cotton Comments

OSU Southwest Oklahoma Research and Extension Center
Altus, OK



April 23, 2013

Volume 3 Edition 2

Current Situation

Precipitation continues to be beneficial in some of the Oklahoma cotton area. Altus Mesonet rainfall from October 1, 2012 through April 22, 2013 totaled 6.60 inches, compared to the Altus "Normal" (1971-2000) of 11.78 inches. For the 2013 calendar year beginning January 1 and through April 22, we are about 87% of normal with 5.55 inches compared to 6.37 inches for the Normal. For the 28 months beginning January 1, 2011, we have received a total of 34.05 inches of precipitation, compared to the normal of 64.69 inches. So, our total precipitation since January 1, 2011 is about 53 percent of normal.

Although recent rainfall has helped in some areas, the caveat is that the North Fork of the Red River watershed still has not delivered much inflow into Lake Altus and it is about 16.8% of capacity at this time. This has significant implications for production for the Lugert-Altus Irrigation District. A Website is available to monitor this situation. To access this website, click here:

[Lugert-Altus Lake Levels](#)

Based on the 1980-2011 "normal" the last freeze date for the Altus area is around April 3. In April, 2013, we have encountered 4 mornings with lows below 32 degrees, including a low of 26 on the 19th. A forecast low of 30 degrees for Thursday morning, April 24th has also been noted. For a summary of the 30-year normal last spring freeze and first fall freeze dates for several locations in Oklahoma and north Texas, click here:

[Last Spring Early Fall Freeze Dates Oklahoma North Texas](#)

Earlier in the year, the National Cotton Council Planting Intentions Producer Survey estimated that Oklahoma would plant 267,000 acres (down 12% from 305,000 acres planted last year. More recently, the USDA-National Agricultural Statistics Service (USDA-NASS) projected that Oklahoma would plant 160,000 acres, down 47% from last year. Precipitation - or lack thereof, freeze injury to wheat, crop prices, and crop insurance issues will ultimately affect this year's planted acreage.

Wheat Freeze and Possible Rotation to Cotton

Challenges just keep coming for agricultural producers in western Oklahoma. Late freezes have unfortunately damaged considerable wheat acreage in Oklahoma, especially the southwestern part of the state. Producers will be making decisions over the next few weeks concerning how to handle the damaged wheat acres. Lint prices are relatively good at this time. Many producers tend to overlook seed income, and gin-run cottonseed has recently been of high enough value to cover ginning costs, plus return some money back to the grower. This can provide producers who have failed wheat acres an opportunity to rotate to cotton. A cotton rotation would enable growers to diversify wheat weed and disease management programs. Also, the overall crop rotation benefit could be observed. Cotton varieties with Roundup Ready Flex and GlyTol traits allow full season over-the-top glyphosate applications. Varieties with the Liberty Link trait also have full-season tolerance to Liberty herbicide, and some new GlyTol/Liberty Link stacked varieties are available. These technologies can be extremely beneficial in terms of broad spectrum weed control. Additional residual herbicides should also be included in a cotton weed management program. If planning to plant other crops in 2014, producers should carefully note any potentially limiting crop rotation restrictions per the respective herbicide label. If producers opt to graze out or cut and bale existing wheat forage, they can prepare these fields for planting cotton. Late April and May rainfall is badly needed to replenish subsoil moisture over much of western Oklahoma, and particularly in the southwest corner of the state in order to make this a viable option. Far southwestern counties have a non-irrigated final planting date for insurance purposes of June 20, and for most other counties in Oklahoma, this date is generally June 10. An important consideration concerning dryland production would include timely termination of the wheat with glyphosate in order to preserve soil moisture. Crop insurance eligibility and coverage in non-irrigated cotton following non-irrigated wheat is complicated, so it will be important to visit with a crop insurance agent for clarification of these issues.

Soil Temperatures

Soil temperatures are still quite cool and nowhere near the target for planting. A year ago on April 24, we planted our first trial and had experienced warm soil temperatures and an excellent forecast. Based on the Altus Mesonet station data, over the last 120 hours (5 days), the 4" depth bare soil temperatures have cycled from a low of about 40 degrees on April 19th to a high of about 74 degrees on April 22.

Note that the Mesonet 5-cm soil depth is equivalent to 2 inches, and the 10-cm depth is equivalent to 4 inches. The 4-inch depth bare soil low temperatures for the last 3 days have been 45, 50, and 53 degrees. The highs for these same days have been 62, 70, and 74 degrees. The overall soil temperature average at the 4-inche depth for bare ground for the last 3 days has been 57 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. The bottom line is that we are nowhere near soil temperatures appropriate for cotton planting at this time.

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](#)

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 bare ground average soil temperature at the 4" depth is 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:

$((\text{maximum air temperature} + \text{minimum air temperature}) / 2) - 60 = \text{DD60 heat units}$

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, but many seed companies will provide this information. 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. 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 of at least 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 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 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 and its adjustment, 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, 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.

2011 Texas Cotton Resource DVD Available at No Charge

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 released an update in late 2011. 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.

[Texas A&M Cotton Resource DVD Content](#)

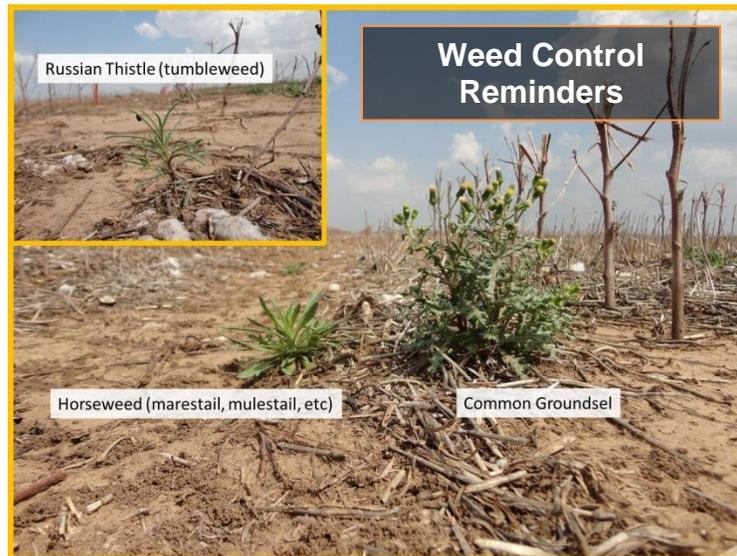
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Weed Control Update

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 (maretail), 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 to planting our options change. Despite highly publicized weed resistance issues, many Oklahoma producers still shift into a "glyphosate only" mode when addressing weed issues within this period. Although this route may be an effective option, there are important issues that need to be considered. First, these particular weed species (horseweed, Russian thistle, common groundsel and morningglory) generate quite a few phone calls early in the season, especially when conditions get hot and dry, control from glyphosate can be inconsistent with these weeds. Unfortunately the phone calls don't come in until the grower recognizes this a few weeks after application. Often planting has already occurred and the crop has emerged. What can I do now? There is a short list of products for over-the-top broad-spectrum weed control in cotton. The second issue is glyphosate resistance. At this point we have to add pigweed (palmer amaranth) to the list of difficult to control weeds. If your field falls into this category, the short list of options previously mentioned becomes even shorter with much greater expense. Therefore steering clear of these two potential issues is highly recommended. How we do so depends upon your circumstances.

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 really 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). 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.



If horseweed is still a concern there are a few options during this period. Since glyphosate resistant horseweed has been confirmed in many locations (most cotton producing counties) across Oklahoma this option is out. Typically by this stage horseweed has bolted and becomes very difficult to control. Paraquat is one of the few options available to producers to effectively deal with this problem closer to planting. Paraquat is also a contact herbicide so once again good results require good coverage (consult label). Another key for paraquat 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 date 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 horseweed (> 8-10 inches in height) require a sequential application 7-14 days later for good control. Also, I have seen good results when tank-mixing paraquat with Harmony Extra XP or FirstShot SG. In addition, these product labels list control of many other broadleaf weeds (various mustards, common cocklebur, redroot and prostrate pigweed, redstem filaree etc.). Although these products (Firstshot SG or Harmony Extra XP) are considered sulfonylureas (group 2 herbicides classified as similar mode of action to Finesse, Cimarron Extra, Glean), they are very different in that they can be applied 14-21 days before planting cotton (depending on soil type-consult label), whereas many other sulfonylureas have very long rotational restrictions before planting cotton. I also want to point out that utilizing different mode-of-actions (herbicide groups) is highly recommended for preventing the spread of glyphosate resistant weeds. I will discuss this more below. In addition, tank-mixes of paraquat with Harmony Extra XP (or FirstShot SG) can be very effective for the control of common groundsel still present closer to planting time.

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 glyphosate tolerance (Roundup Ready Flex or GlyTol). 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 just now beginning to see 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 mornigglory in cotton, which is an occasional weakness of the Roundup Flex system. 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, and “kill two birds with one stone.” 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. However if you are considering a Liberty Link only variety to guard against glyphosate resistance, extra emphasis is needed in this department. The following suggestions apply regardless of the herbicide technology planted (Roundup Flex variety, Liberty Link, or Glytol+Liberty Link). In my opinion a yellow herbicide is mandatory at this point. 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 - shallow tillage, rainfall or irrigation. Taking advantage of the rainfall component is critical. Therefore we place more importance on incorporating residuals early-season, when we still have good chances to receive the activating rains. Once we get into July, our chances of getting the full benefit out of a residual herbicide are highly dependent upon whether or not a sprinkler is available. Therefore, especially in areas without overhead irrigation, defending against resistant weeds is an early-season battle. Also, the last trip through the field (typically layby) should include a residual component of some kind (Direx, Caparol, Cotoran, Staple, Valor, etc.). Preventing late-season escapes ensures a good start the following year. 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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Herbicide Program Suggestions For Fighting/Preventing Glyphosate Resistant Pigweed In Oklahoma Cotton



Weed Control Programs in Glyphosate Tolerant Cotton Varieties (Roundup Ready Flex, GlyToI)

	Production System	Preplant Burndown or Incorporated	At-plant Burndown or Preemergence	Early to Mid-season Postemergence	Late-season Layby-Hoods
1	Minimum or No-till	Dicamba or 2,4-D + Glyphosate	Glyphosate + Prowl H20	Glyphosate + Staple LX	Aim + Direx
2	Minimum or No-till	Dicamba or 2,4-D + Valor + Glyphosate	Gramoxone SL + Direx	Glyphosate + Warrant	Glyphosate + Direx
3	Minimum or No-till	Dicamba or 2,4-D + Sharpen + Glyphosate	Glyphosate + Dual II Magnum	Glyphosate + Prowl H20	Caparol + MSMA
1	Conventional tillage	Treflan or Prowl H20	Caparol	Glyphosate + Staple LX	Valor + MSMA
2	Conventional tillage	Treflan or Prowl H20	Direx	Glyphosate + Warrant	Aim + Caparol
3	Conventional tillage	Treflan or Prowl H20	Staple LX	Glyphosate + Prowl H20	Direx + MSMA

Without the use of residuals
Palmer amaranth can emerge
all season long...plan ahead!



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