Cotton Comments

OSU Southwest Oklahoma Research and Extension Center
Altus, OK

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Current Situation

The 2012 cotton planting season is just around the corner. We have been very fortunate to receive badly needed rainfall in many areas of southwestern Oklahoma. Precipitation amounts as recorded by the Altus Mesonet Station since last October are as follows:

Month	Precipitation (inches)
October 2011	3.05
November 2011	1.58
December 2011	1.26
January 2012	0.58
February 2012	0.64
March 2012	3.06
Total	10.17

This rainfall total has provided considerable relief for a lot of producers and we do have some good wheat in the area, but because of poor subsoil moisture it did get considerably thirsty by the end of February. March and early April rainfall has been highly beneficial in this situation. Weed pressure has steadily built over the last several months and producers have been busy trying to rein in this growth with herbicide applications.

With all of this said, in the cotton patch we are still a long way from being healed up from the Great Drought of 2011 and we are certainly in much better shape than one year ago. We have aquifers which need recharging and we also badly need runoff in the North Fork of the Red River watershed which feeds Lake Lugert. Currently the reservoir that feeds the Irrigation District is about 21% of capacity. We need some serious runoff in the watershed soon. A Corps of Engineers website which tracks the reservoir status can be accessed here:

Click here

It is my understanding that March 2012 ended as the warmest on record across the State of Oklahoma, going back to 1895. This indicates that things are moving along at an accelerated pace. If this warming trend continues, I wouldn't be surprised to see producers watching the soil thermometers and soil moisture conditions and getting anxious to plant in the last half of April.

2011 Extension Cotton Project Annual Report

Several weeks ago, the 2011 Extension Cotton Annual Report in PDF format was sent via email to our Cotton Comments subscribers. This report contains summaries of 2011 projects which survived the Great Drought. If you missed this and would like to download a copy, feel free to do so by clicking here:

Click here

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 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: To access this website:

Click here

Variety Selection Issues

Selecting productive cotton varieties is not an easy task, especially in Oklahoma where weather can literally “make or break” a crop. Producers need to do their homework by comparing several characteristics among many different varieties, and then keying these characteristics to typical growing conditions. We can’t control our growing environment from year to year, but we can select the varieties we plant based on desired attributes. It is very important to select and plant varieties that fit specific fields on your operation. Don't plant the farm to a single variety, and try relatively small acreages of new ones before extensive planting.

Variety Testing Publications

If disease issues are not concerning, then scrutinize all possible university trial data that are available to see how a specific variety has performed across a series of environments, and if possible, across years. It is best to consider multi-year and multi-site performance averages when they are available. However, due to the rate of varietal release, many new varieties are sold which have not undergone multi-year university testing, or perhaps no university testing at all. Our 2011 variety testing program was gutted by the Great Drought and those results are available in the 2011 Extension Cotton Project Annual Report discussed above.

In 2010, Shane Osborne, Associate Extension Specialist and his group conducted 16 locations of replicated small plot trials (7 irrigated, 9 dryland) with 20 entries in producer

fields. These trials were conducted under uniform, disease-free conditions. Shane has has included summaries over locations for the dryland and irrigated locations. This is an excellent resource and provides much information on variety performance, including yield, lint turnout, and fiber quality. Individual site data as well as the 9-location means for dryland and the 7-location means for irrigated sites are included.

The Extension Cotton Research & Demonstration in Oklahoma 2010 Annual Report is available here:

Click here

For those interested in management of specific cotton diseases and nematodes, Texas AgriLife Research (Dr. Terry Wheeler) and Texas AgriLife Extension Service (Dr. Jason Woodward) results from High Plains locations with Verticillium wilt, Root-knot nematode, and Bacterial blight comparisons among varieties are available. Although these trials were obviously not conducted in Oklahoma, it is the best available information pertaining to variety performance under these specific disease and nematode pressures. Of course one would want to determine if top performers under the specific disease or nematode pressure also rise to the top in Oklahoma variety performance tests.

A comprehensive report on the disease reaction of many newer varieties has been posted on the Lubbock Center Web site and is available here:

Click here

A publication that discusses the identification of vascular wilts (Verticillium and Fusarium) in cotton is available here:

Click here

Specifically, some producers in southwestern Oklahoma have fields which have significant Verticillium wilt pressure. An excellent publication on integrated management of Verticillium wilt in cotton, is available here:

Click here

When it comes to variety selection in Oklahoma, several factors are important to consider.

Maturity (Earliness)

Scrutinizing the relative maturity rankings provided by seed companies will be beneficial. Don't expect a mid-full season cotton variety to perform well in a short season environment where an early or early-mid might generally work best. Many longer season cotton varieties are better adapted to areas with longer growing seasons,

although significant gains in yield may sometimes be obtained in years with warm September and October temperatures. Longer season varieties will typically do much better when planted earlier and then provided an excellent finish. For later plantings, early-mid maturity varieties may be better, and for late plantings or replant situations, early maturity varieties may be better. In years such as 2009, with a difficult finish due to poor maturing weather at the end, many fields planted to some of these varieties had somewhat lower yield and more immature fiber resulting in lower micronaire.

Pounds

Yield potential is probably the single most important agronomic characteristic, because pounds do drive profitability and provides for the safety net of higher actual production history (APH) in case of catastrophic loss of acres. The benefit this can provide from the crop insurance perspective is important in our high risk area. Yield stability across environments is going to be important, and basically what we want to find is a variety that has the ability to provide high yield across varying water inputs.

Fiber Quality

Producers should also consider lint quality. We have made a lot of progress in terms of fiber quality over the last several years. We have seen significant improvements in overall fiber quality packages associated with our modern varieties. Staple is generally good to excellent for most new varieties. A lot of things can affect crop micronaire. These factors can include overall environment, planting date, variety, early season fruit loss with later compensation, excessive late season irrigation or rainfall, seedling disease, early season set-backs due to hail damage, blowing sand, thrips, etc. Fiber strength has also significantly improved and many newer varieties tend to be at least 30 g/tex. Length uniformity can be affected by staple, maturity, and harvest method (picker harvested typically higher than stripper harvested). Higher maturity fiber generally results in better uniformity. Leaf grade can be affected by density of leaf hairs on specific varieties in some years. Generally, cool, wet fall conditions can lead to lower quality leaf grades for varieties which tend to be hairy. In drier harvesting environments these differences tend to diminish. Color grades are basically a function of weathering or exposure of the fiber on the plant to wet conditions. The highest quality that a cotton boll can have is on the day that it opens. After that if conditions favor microbial growth (warm, wet conditions) or if an early freeze affects immature cotton, then color grade quality will likely be reduced. Bark contamination is generally also driven by significant late season rainfall followed by a freeze. In some years this can't be easily managed if stripper harvested. Conversely, picker harvesting can significantly reduce or eliminate bark contamination.

Storm Resistance

Storm resistance is still a concern for growers in our area. Even though many producers have adopted less storm resistant cotton varieties over the last several years, and generally done well with those, the overall management system the producer

adopts can be important. Under significant moisture stress on dryland, some newer varieties may provide an unacceptable level of storm resistance, especially if the field is “left to the freeze.” Producers planning to execute a sound harvest aid program as soon as the crop is mature can probably grow some fields of less storm resistant cotton. However, having large acreages of varieties with low storm resistance might be a prescription for disaster if the right environmental conditions align at harvest. Do not plan to leave looser open-boll cottons in the field until a freeze conditions the plants for harvest. Unacceptable pre-harvest lint loss is likely to result. Higher storm resistance varieties are better adapted to our harvesting conditions and they are more likely to survive damaging weather prior to harvest without considerable lint loss. Inquire about the storm resistance of any variety on your potential planting list. If you do choose a variety with low storm resistance, plan and budget ahead for a good harvest aid program that will let you achieve an early harvest. Good storm resistance data are now being provided by most companies and we will evaluate all Extension trials for this attribute in 2012. For those planning to harvest with spindle pickers, higher storm resistant varieties may possibly result in reduced picker harvesting efficiency.

Disease and Nematode Resistance/Tolerance

Producers should likely not plant the farming operation to one cotton variety. A question should be "do I have plant diseases or Root knot nematodes in this specific field?" Although we have not been able to identify substantial acreage with this pest in Oklahoma, varietal tolerance or resistance will be critical for managing this. One thing to consider is whether you know which disease is present. If you have a problem with a wilt disease and don't know what it is, then you need to have the problem identified. If known Verticillium wilt pressure is present, then take a look at Dr. Terry Wheeler and Dr. Jason Woodward's data from several locations investigating variety performance under constraints from this particular disease. The same should be considered for Fusarium wilt/Root-knot nematode issues. Many times varieties which do well under Verticillium wilt pressure may not be the same ones which rise to the top with Fusarium or Root-knot nematode pressure. Bacterial blight is an occasional problem in the region. There are several varieties out there that can provide high levels of resistance/immunity.

Biotech Trait Types

Producers need to ask themselves several questions. Do I want a herbicide-tolerant variety, if so, which system? Weed control has been catapulted forward by the advent of transgenic Roundup Ready Flex, GlyTol, Liberty Link, and Glytol plus Liberty Link (“stacked”) cotton varieties. The agronomic capabilities of glyphosate tolerant cotton varieties continue to improve and the weed control system it enables is very effective if properly executed. The Liberty Link system has thus far been more widely adopted in other regions, perhaps due to our tough early season environment in some years. The widely anticipated GlyTol, the proprietary glyphosate tolerance trait from Bayer CropScience (BCS) has been approved by regulatory agencies and has been launched. In 2011, there are a few varieties with GlyTol/Liberty Link “stacked” technologies.

As for insect protection, the Bollgard II and Widestrike technologies have provided outstanding lepidopteran pest control. Based on our local pricing, these technologies have been widely planted on Oklahoma cotton acres. Because of the lack of disruption of beneficial arthropods by insecticides used to target bollworms, etc., aphids will likely not be flared which is of considerable value.

Seed and Technology Cost

Cost should not necessarily be the primary reason for selecting a variety, but it is important. The value of a high yielding cotton variety with biotech traits to ease management requirements across a large number of acres is a serious consideration. Over the last several years, we have seen significant producer gravitation to transgenic varieties. We have a large number of commercial varieties from several companies being sold in our region in 2012. Over 100 varieties are available. Many trait combinations are available.

When considering the cost of transgenic varieties, the Plains Cotton Growers 2012 Seed Cost Comparison Worksheet can certainly be useful. Oklahoma is in the same seed/technology pricing zone as the Texas High Plains. Shawn Wade developed the Microsoft Excel spreadsheet which can be used within your Web browser, or downloaded and saved to your computer. Nearly all of the commercial varieties available in our region are listed. The user can select up to 9 varieties to simultaneously compare total seed and technology fee costs based on a specific seeding rate. The row spacing and seed per row-ft can be entered by the user. This then calculates a seed drop on a per acre basis. Then, based on published pricing for the various seed varieties and technology fees, the cost per acre is automatically calculated.

The 2012 Plains Cotton Growers Seed Cost Calculator Excel Worksheet is available here:

Click here

OSU Cotton Nitrogen Recommendations Updated

After review of various projects conducted over the last several years, it has been decided to update the OSU nitrogen (N) fertilizer recommendations. It will take a while to incorporate these modifications into our system. For the last several decades, the recommendation has been 60 lbs N per bale of yield goal.

Unlike cereal grains, cotton can be impacted by both under and over fertilization. Under fertilization can result in reduced fruiting site development leading to boll abortion, reduced lint yield, and potentially reduced fiber length and strength. Over fertilization can result in excessive vegetative growth (rank growth), higher plant growth regulator requirements to check the unwanted growth, decreased lint turnout, possibly increased Verticillium wilt disease incidence, maturity delay resulting in immature fiber (low

micronaire), negative effects on harvest aid chemical treatment efficacy, and ultimately reduced lint yield and fiber quality.

Because of varietal changes, lint yield potential, and other factors, it has been decided to change the recommendation to 50 lbs of N per expected bale of lint. This amount of N per bale of yield goal should be appropriate for most soils. It should be noted that the amount of N mineralized during the growing season is unknown for most soils, but it is obvious based on fertilizer tests conducted in southwestern Oklahoma that contributions from atmospheric N deposition, and organic residue mineralization can be adequate in some irrigated soils to produce more than a bale of lint per acre. Yield goals can be determined by one of two methods: a) the average of the three highest yields from the past five years or b) the five-year average plus 20%.

The total amount of N applied for cotton should be the yield goal rate minus soil test N, and any contributions of nitrate-N (NO_3-N) from irrigation water (if applied). Since cotton is a tap-rooted crop it is recommended that both top soil (0-6 in) and sub-soil (6-18 in) samples should be collected and analyzed for residual NO_3-N. The amount of NO_3-N found in sub-soil can be significant and therefore can result in substantial fertilizer savings in terms of reduced N application.

In some areas of Oklahoma, irrigation water contains sufficient NO_3-N that should be credited toward the cotton N requirement. In order to determine if irrigation water contains significant NO_3-N, a water sample must be collected and submitted to a testing laboratory. For every one ppm of NO3-N in irrigation water, 0.23 lb per acre of N will be added to the soil with each acre-inch of water applied. Thus, one acre-foot (12 acre-inches) of 10 ppm NO3-N irrigation water would supply about 27 pounds of N per acre.

This can be calculated using the following:
ppm of NO_3-N in water x 0.23 x inches of water applied = lbs of N per acre added.

As an example, suppose 15 inches of irrigation water are applied and the water test indicates 10 ppm for NO_3-N. Based on the above formula, an additional 34.5 lbs of N per acre will be applied during the growing season (10 ppm x 0.23 x 15 inches = 34.5 lbs N/acre). I recently generated a table which summarizes information for varying irrigation water NO_3-N concentrations and application amounts. It is available here:

Click here

Total N (soil test plus irrigation and fertilizer N) of 175 lbs per acre should be adequate for lint yields of 3.5 bales per acre and greater. This maximum rate may need to be reassessed in the future due to differences in N use efficiency among irrigation delivery systems, newer transgenic traits, or if yield otherwise increases to new record high levels.

Table 1. Nitrogen requirement for cotton production in Oklahoma (actual N needed is the amount listed in the table less soil test and irrigation water test N).

Yield Goal (bales/acre)	N requirement (lbs N/acre)
1	50
1.5	75
2	100
2.5	125
3	150
3.5 and greater	175

A new publication authored by Dr. Brian Arnall and me will be available soon. We will make this available in a later Cotton Comments newsletter.

R.B.

Insecticide Seed Treatments for Thrips Control

Now is the time to decide on whether to use a seed treatment or wait to control thrips by foliar spray application if damaging populations develop. There are pros and cons to both options. Seed treatments are easy to use and relatively safe to handle. In-season chemical control application timing is critical and weather plays a part. One of the "pros" of waiting is that added expense only occurs if a damaging population occurs and a decision is made to treat. Also cotton has a great ability to compensate for early damage in Oklahoma growing conditions. If you decide to wait for foliar application, this will be discussed in later newsletters.

There are a number of seed treatments on the market which include Gaucho Grande, Cruiser, Avicta Complete Cotton, and Aeris. The length of control is dependent upon growing conditions and thrips pressure. Additional follow-up thrips control can sometimes be warranted after using any of the below listed seed treatments.

- Gaucho Grande, Acceleron I, and generics (imidacloprid, a systemic neonicotinoid insecticide) are weak against western flower thrips, our primary species in Oklahoma. If onion thrips are the only species they provide acceptable control. The length of control for western flower thrips lasts about 7 days[1].

- Aeris (imidacloprid and thioidicarb). The added thiodicarb increases western flower thrips control and provides some nematode control. Thrips control generally lasts 14-18 days[1].

- Cruiser (thiamethoxam) is another systemic neonicotinoid but extends control of western flower thrips. The length of thrips control is generally about 14-18 days[1].

- Avicta Complete Cotton and Acceleron N both contain multiple products including upgraded fungicides. Length of western flower thrips control is about 18-21 days.[1].

For all of the above treatments 21 days is the maximum length of control. A cotton plant can still sustain thrips damage until past the fourth true leaf stage. In some years, because of varying growing conditions, this is adequate. In other years the crop may not reach this stage after 21 days, and thus may not be adequate. Therefore, it may be important to keep cotton growth and development rate and foliar thrips control products in mind.

[1] Dr. David Kerns (formerly Texas AgriLife Extension Entomologist, Lubbock; currently Louisiana State University Professor/Fields Crops Entomologist, Winnsboro) provided the length of control for each treatment.

J.G.

Cotton Planting Not Far Away…Keep It Clean!

Several years of data from an OSU Southwest Research and Extension Center date of planting experiment suggest that the middle of May is the prime time to plant irrigated cotton in the southwest corner of the state. Since we have now hit April there are some things growers should be thinking about as it pertains to preplant weed control strategies. Since a few earlier newsletters (February and March editions) have hashed out issues about horseweed and common groundsel problems I won't spend much time re-addressing the details of those issues. However, there are a few points to rememphasize. Since hormone herbicides are a big part of preplant weed control programs for cotton its a great time to remind growers about the planting restrictions associated with these products (namely 2,4-D and dicamba) and what weed control options remain once the opportunity for their use has passed.

BASF's label for Clarity (dicamba) states that "*following an application of Clarity and a minimum accumulation of one inch of rainfall or overhead irrigation, a waiting interval of 21 days is required per 8 fluid ounces per acre or less*." In addition the label also states "*do not make Clarity (dicamba) preplant applications to cotton in geographic areas with average annual rainfall less than 25 inches*." If we combine this information with the

knowledge that the old labeling for dicamba recommended a 45 day interval between application and planting I think its apparent that rainfall or overhead irrigation is critical when it comes to planting cotton behind dicamba applications. There are some areas of the state that may be "on the fence" as it pertains to the 25 inch average annual rainfall requirement. In these areas we typically recommend the use of 2,4-D (instead of dicamba when overhead irrigation is not available).

If 2,4-D is the hormone of choice the rules are somewhat simpler to digest. Cotton may be safely planted 30 days after an application of 2,4-D. That's it. Since planting time is essentially around the corner these restrictions should be kept in mind when dealing with any weed flushes from this point (April) forward. If you are in the position where you have missed these windows of opportunity then your strategy must change significantly.

Often producers substitute PPO (protoporphyrinogen oxidase) inhibitors with no soil activity (Aim or ET) or paraquat (Gramoxone Inteon or Firestorm) for hormone herbicides when attempting to burn down weeds closer to planting because they have no planting restrictions. Its also important to remember that not all PPO inhibitors are created equal. Although Aim and ET have no soil activity and can be used right up to and/or in preemergence fashion (after planting but prior to emergence of cotton) there are other products in this family that have critical restrictions when it comes to planting cotton.

Valor is one that has been around for a while. Although it is also a PPO inhibitor it has soil activity and additional restrictions on its use before planting cotton. When applying Valor at 1 oz/A (for no-till or strip till production only) 14 days must pass before cotton planting may occur. As the rate applied increases to 1.5 to 2.0 oz/A (still only on no-till or strip till production) the planting interval increases to 21 days. In addition, if Valor is applied at 2.0 oz/A in conventional tillage then 30 days must pass prior to planting cotton. In all situations regardless of timing or rate of Valor there is a requirement that one inch of rainfall or overhead irrigation must occur between application and planting or crop injury may occur. It is also important to consult the label if application rates over 2.0 oz/A have been applied earlier in the season (last fall or over the winter) because the planting restrictions continue to increase with increasing rates.

Sharpen is another PPO inhibitor that has been mentioned in several previous newsletters. This product also has significant soil activity and strict preplant requirements of 42 days + one inch of rainfall or overhead irrigation between an application of 1.0 oz/A and planting. Those intending to plant later in the season that may still be considering this product should consult the prior newsletters (click here) for information on the use and performance of Sharpen in Oklahoma.

Earlier I also mentioned the use of paraquat for burning down weeds prior to or at planting. There are a few things to remember when utilizing paraquat in these burndown programs. Although paraquat is a non-selective herbicide (has activity on both grasses and broadleaves), there are some situations where its use requires special

attention. Weed size at application and spray volume (or coverage) are some critical factors when using paraquat. In many cases weeds beyond optimum size at application require multiple applications to achieve adequate control. Since optimum size at application can be species dependent, consult the label for your particular situation. Although the label recommends preplant applications for cotton to have a *"10 gallon minimum total spray per acre,"* it also mentions that *"when spraying less than 20 gallons of spray carrier per acre weeds should not exceed 6 inches."* The label also states that *"the use of flat fan nozzles will result in the most effective application"* and that *"flood nozzles are generally not as good as flat fans since they produce large uneven droplets. The use of flood nozzles may result in reduced weed control due to inadequate coverage."* Therefore "*when spraying less than 20 gallons of spray carrier per acre, use only flat fan nozzles as recommended in the chart below*." The chart also addresses spray pressure (at nozzle). They recommend 30-50 psi to ensure good coverage with this product.

Table 1. Nozzles, Pressures and Setup.

	Nozzle Type	
	Flat Fan	Flood
Maximum Size	8	15
Spray Pressure (at nozzle)	30-50 psi	30-50 psi
Maximum Nozzle Spacing	30"	40"
Direction of Spray Pattern	Down	Down
Maximum Speed	10 mph	10 mph
Spray Overlap (at each edge)	30%	50%

In addition many ground rig applicators have gotten very used to spraying at speeds above 15 mph when the terrain allows. This chart specifically addresses that issue (10 mph max speed) because it is not uncommon for high speeds to result in poor coverage. Paying close attention to these details will definitely maximize the effectiveness of paraquat. Lastly, if you are considering applications of some of these burndown products immediately after planting, be 100% sure that your cotton crop has not begun to crack the soil surface. At this stage cotton seedlings are extremely sensitive and only a small amount of herbicide is required for complete death.
S.O.

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