



Cotton Comments

OSU Southwest Oklahoma Research and Extension Center
Altus, OK

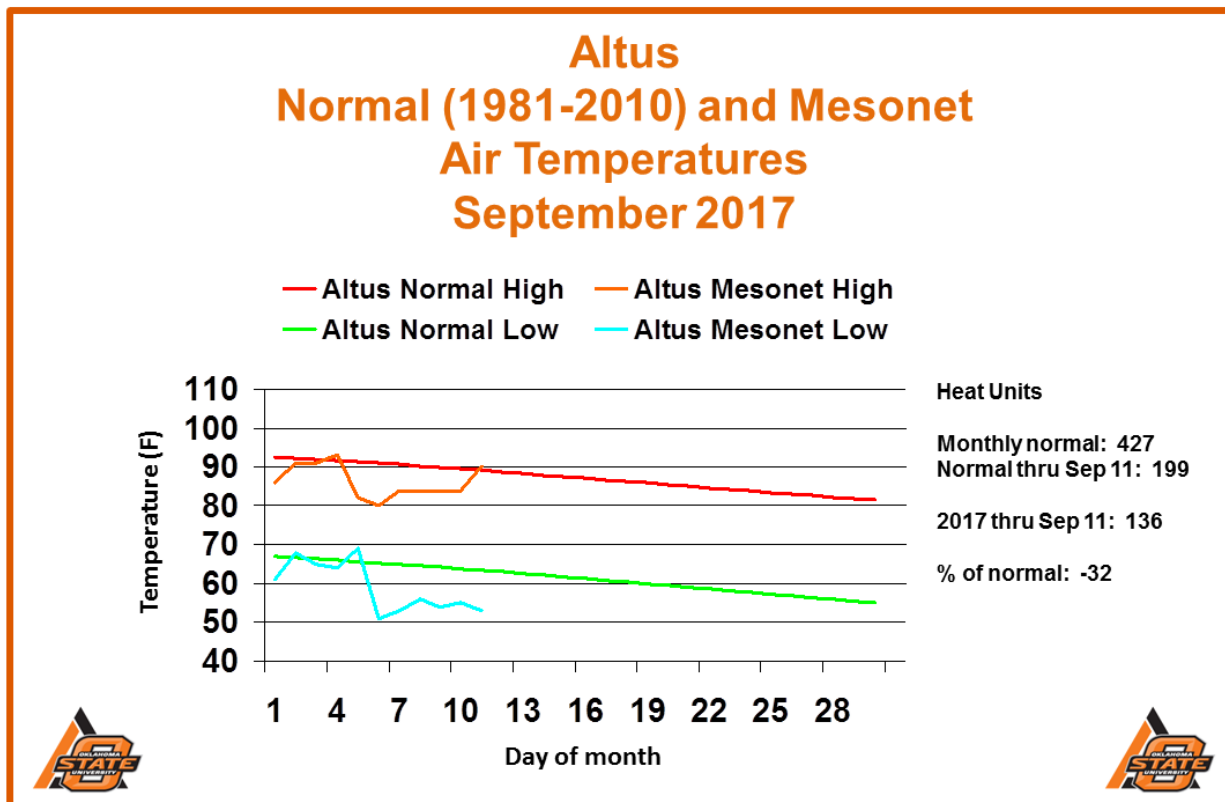


September 12, 2017

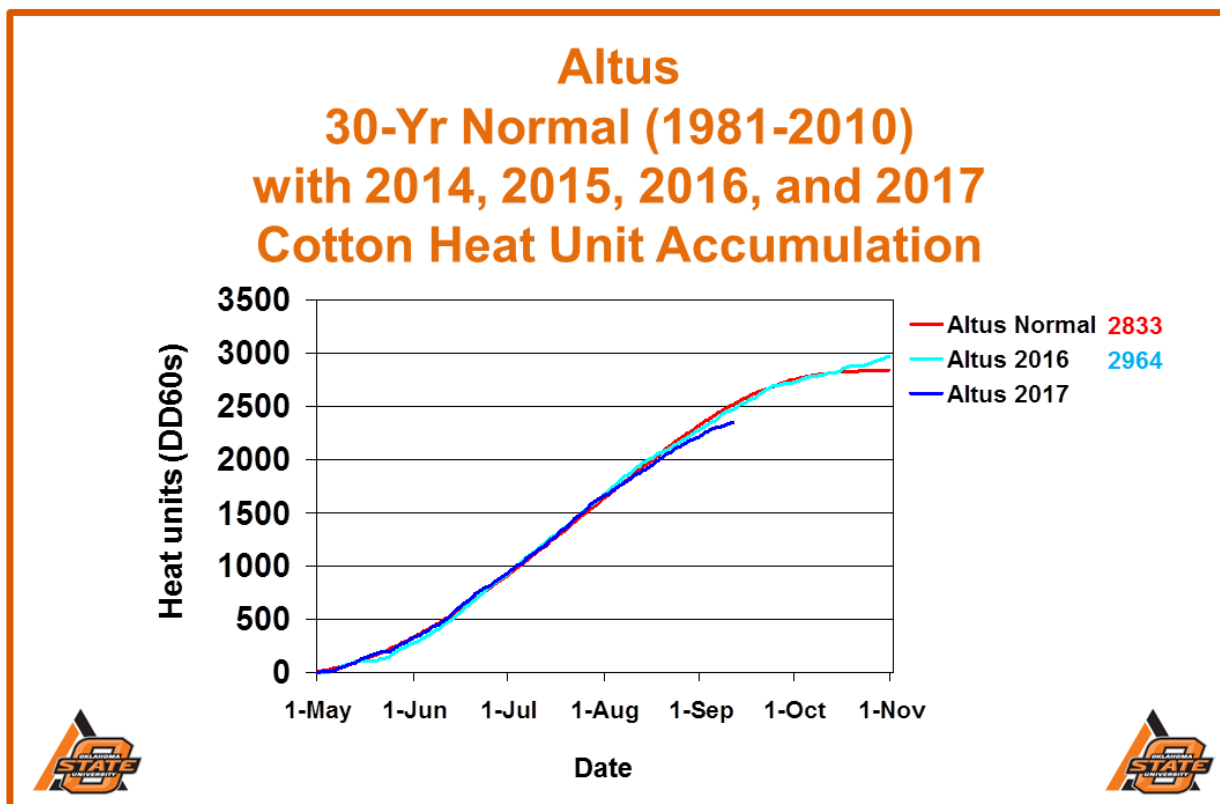
Volume 7 No. 13

Crop and Heat Unit Update

Cooler than normal temperatures have been encountered during the first 11 days of September (see September 2017 Altus Mesonet temperature vs. normal temperature graph below). The first 11 days of September generated about 136 cotton DD60 heat units compared to 199 for the 30-year normal (1981-2010).



The seasonal cotton heat unit accumulation from May 1 through September 11 slide presented below shows that the last 40 days or so have been somewhat cooler than our 30-year normal (2017 data, dark blue line). The 2017 accumulation line is dropping down below the long-term average (red line). Hopefully with the warm forecast, we can continue the remainder of our season with good to excellent weather to enhance maturity for late planted fields.



The table below shows Mesonet heat unit accumulations for planting dates of May 10 and 20, and June 1, 10 and 20 through August 30 for various locations in the southwestern corner of the state. The total for the various planting dates at Altus range from 2275 for the May10 date to 1637 for the June 20 date. The “normal” or what I call the “long-term average” (from 1981 through 2010) from September 11th until October 22 (the time cotton heat units approach zero) totals 332. So theoretically at least we have quite a bit of cotton maturing temperatures still to come. Generally speaking we can still have fairly good maturity in cotton crops with the lower yields typically encountered in dryland production when the heat units total out to 2000 or so. If really high yields are present, or if late set bolls are a large fraction of the total production, this may be inadequate for good boll maturity. A lot of things can impact cotton maturity besides just heat units (solar radiation, late season rainfall, etc). However, based on the table below it appears that dryland cotton planted as late as June 20th around Altus that has up to 2 bale/acre potential may still be okay, assuming we have a “normal” September and October. If we shift this to areas farther north and September and October fail to deliver outstanding maturity temperatures, some high yielding dryland fields may have a

challenge to mature. It appears that our irrigated fields which were planted before the end of May are probably going to finish okay. These are only my thoughts and as usual, only time will tell. We need to recognize that we didn't have any "maturity busting" temperatures (low temperatures less than 40 degrees or so) until after October in 2016, perhaps we can dodge that bullet again in 2017.

2017 Mesonet Cotton Heat Units for Various Planting Dates								
	Altus	Tipton	Grandfield	Hollis	Erick	Hobart	Weatherford	Fort Cobb
May 10 - Sep 10	2275	2310	2345	2235	2009	2159	2106	2070
May 20 - Sep 10	2155	2190	2221	2131	1934	2055	2026	1971
June 1 - Sep 10	2015	2055	2080	2008	1839	1952	1933	1865
June 10 - Sep 10	1873	1913	1946	1869	1732	1828	1811	1741
June 20 - Sep 10	1637	1682	1744	1634	1518	1613	1600	1529
Altus LTA from Sep 11 thru Oct 22	332							
Total for various planting dates at Altus using LTA data from September 11 to end of season								
May 10	2607							
May 20	2487							
June 1	2347							
June 10	2205							
June 20	1969							

Yield Estimation

This is the time of year when we typically get a lot of phone calls related to cotton yield estimation. Although a very risky endeavor, estimation of cotton yields could be important this year. A while back, I generated a handout based on some previous work conducted by Dr. Will McCarty, now retired Extension Cotton Specialist at Mississippi State.

[For a copy of Estimating Cotton Yield Using Boll Counting, click here.](#)

This publication considers several factors such as row spacing, boll size, and two estimated lint percentage levels (35% and 38% picked lint percentages of the SEED COTTON). When looking at several years of boll sizes from drought stressed dryland sites, the 35% picked lint percentage (Table 1), and 2-3 g per boll size are probably appropriate to use. In lower yielding irrigated cotton, the 38% chart (Table 2) and 3-4 g per boll size are probably acceptable. For higher yielding irrigated cotton, the 38% chart (Table 2) and 4-5 g per boll size are likely best. In my opinion, because of boll size, seed set, and other factors, yield estimation should be approached with trepidation, especially in drought years.

Basically this handout indicates that about 155,500 normal bolls are required to produce a 480-lb bale of cotton (average of 4.0 g seed cotton/boll = 1.4 g lint assuming a lint percent for seedcotton of 35%). This is equivalent to about 325 bolls per lb of lint. For 40-inch rows this calculates to 11.9 bolls per row-ft for a one bale/acre yield (155,500 bolls/13,068 row-ft per acre for 40-inch rows). This is very close to the "one boll per inch = one bale per acre" number that many crop watchers use to estimate yields in 40-inch rows. For 30-inch rows this works out to 8.9 bolls per row-ft for a one bale/acre

yield (155,500 bolls/17,424 row-ft per acre for 30-inch rows). **For drought stressed bolls the boll number required will increase substantially.**




Crop Maturity Determination



Crop maturity determination is critical for a successful harvest-aid program. Premature crop termination has been shown to reduce lint yield, seed quality, micronaire, and fiber strength. Harvest-aid chemicals cannot increase the rate of fiber development. Only additional good growing weather including open skies and adequate heat units combined with functional leaves can mature cotton bolls.

Three Crop Maturity Determination Methods:

- 1) Maturity can be determined by using a sharp knife to cut into the bolls. If the boll is watery or jelly like on the inside, then it is immature and needs more heat units. If boll development is such that the knife cannot slice through the lint, then the boll is nearly mature. Close inspection of the seed will give further indication of boll maturity. If the seed coat is turning tan and the seed leaves (or cotyledons) are fully developed, the boll is mature. For an example of this, see below.

Timing Harvest Aid Applications by Boll Maturity

	Requires more heat units prior to ethephon application. Ethephon will probably open this boll but it likely will not fluff.
	Fully formed seed leaves (cotyledons), tan seedcoat ring forming. Ready for ethephon application.
	Fully Mature, blackened seed coat, should open with paraquat.



- 2) Open boll percentage is another method that can be used to determine crop maturity. This method is fairly easily accomplished, but can have limitations. One just needs to measure off a known number of row-feet in multiple areas of the field, then begin counting open bolls and unopened or “green bolls.” Track these separately. Once both types have been counted, simply add the green boll

count and the open boll count to obtain the total number of bolls. After that, divide the open boll total by the total bolls and multiply times 100. This allows for a reasonable observation of percent open bolls. The limitation that occurs with this method arises when a “fruiting gap” exists in the plant. If bolls are present at the bottom of the plant, none in the middle, and more bolls at the top, this can give a skewed representation of the maturity of the field.

- 3) Nodes above cracked boll (NACB) is a tool that can be used to time harvest aid application (Figure 1). Several years ago, a Beltwide cotton harvest aid timing project was conducted over multiple sites and years by a team of extension personnel across the Cotton Belt. It was determined that if the uppermost first position-cracked boll is within three nodes of the uppermost harvestable first position boll then no lint weight will be lost if a defoliant-type harvest aid is applied at that time (Figures 1 and 2). However, if the uppermost harvestable first position boll is four or more nodes above the uppermost first position cracked boll, then potential for some lint loss exists. The lint loss potential increases as the NACB increases. Micronaire reduction generally follows a similar pattern when using the nodes above cracked boll criterion. When defoliant type chemicals are applied, some slight subsequent fiber development may occur before defoliation. If applying desiccants, more bolls must be mature in order to reduce the risk of fiber weight loss or reduction of micronaire, thus two NACB would be a better target.

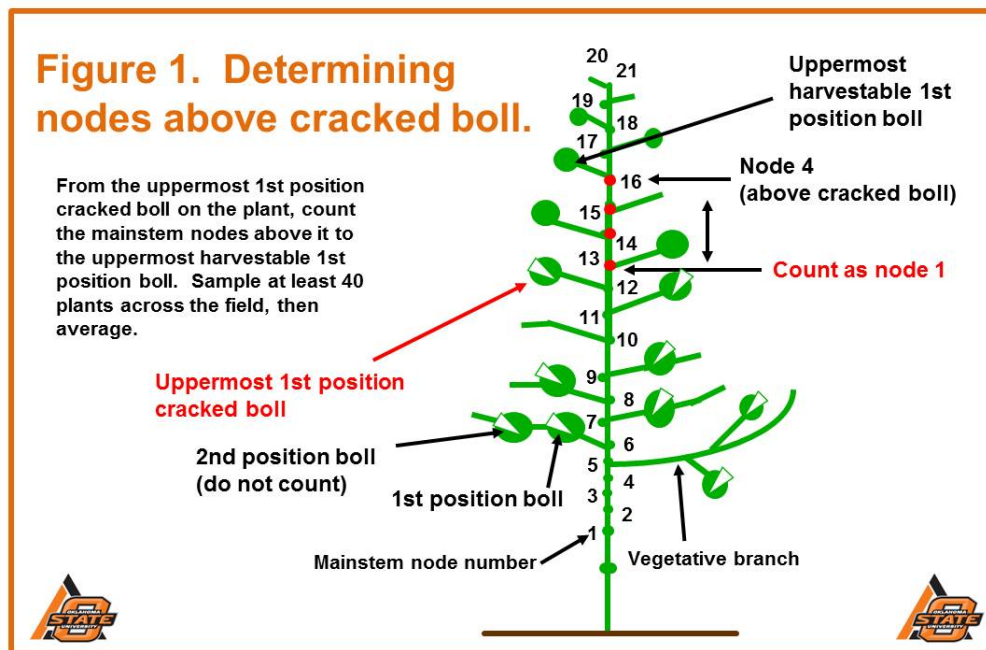
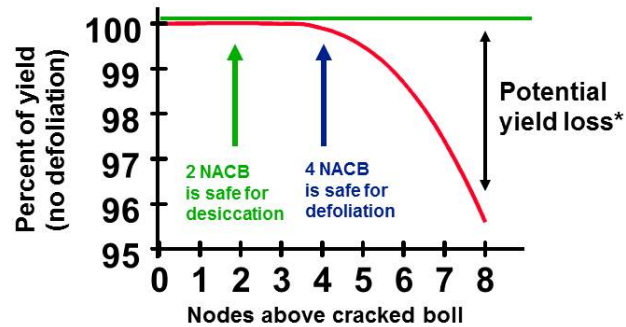


Figure 2. Potential yield loss based on NACB method.



* when desiccating, add 2 to value for NACB to determine the effect on yield (desiccation at 2 NACB=percent of yield at 4 NACB for defoliation)

When determining boll maturity of adjacent fruit, one can consider the following. When moving up the plant from a first position boll that has just cracked to a first position unopened boll on the next fruiting branch, about 60 additional heat units (DD60s) are required to obtain similar boll maturity. If moving out from a first position boll to a second position boll on the same fruiting branch, about 120 heat units will be required to reach the same level of maturity. For an individual boll, a total of about 800-850 heat units are required after pollination to produce normal size and quality. However, bolls obtaining fewer heat units may still make productive lint of lower micronaire that may contribute to final yield.

[For a handout that helps explain the rate of crop maturity for the Altus vicinity, click here.](#)

Conditions Affecting Harvest Aid Performance

Proper harvest-aid product selection, tank-mix partners, and rates vary with environmental and crop conditions. What works best in one year is not necessarily the best for the next season. Effectiveness of harvest-aid chemicals is always a concern. Several factors affect the performance or lack of performance of harvest-aid chemicals.

These factors improve the performance of harvest-aid chemicals:

- Warm, sunny weather
- Soil moisture relatively low but sufficient to maintain cotton plant in active growth condition without moisture stress
- Soil nitrogen levels relatively low
- Leaves active and uniformly expanded on plants

- Little or no secondary growth evident on plants
- Plants with a high percentage of open bolls that have shed some mature leaves

Conversely, here are some factors that negatively affect harvest-aid chemical performance:

- Applications made under cool (below 60° Fahrenheit), cloudy conditions
- Long periods of wet weather after treatment
- Plants in vegetative growth state with low fruit set
- Plants severely moisture stressed with tough, leathery leaves at time of treatment
- High soil moisture and nitrogen levels, which contribute to rank, dense foliage and delayed maturity
- Plants exhibiting secondary growth (regrowth) after a “cut-out” period
- Improper calibration of application rates and poor spray coverage

Harvest-Aid Product Selection

In general, the yield and condition of the cotton crop should determine the choice of harvest-aid product. If the leaves are beginning to shed and are reddish to purple, they will more easily drop off without too much “sticking” (when leaves do not drop and are frozen on the plant). The natural process that causes leaves to drop can be stopped by stress such as a freeze or desiccant application. Also, some cotton varieties do not defoliate as easily as others. **Increased leaf content in the harvested cotton can potentially reduce lint quality by triggering lower quality leaf grades.** Drought-stressed leaves generally have a much thicker waxy coating, which can reduce harvest-aid performance.

Regrowth

Secondary growth (regrowth) sometimes occurs after the plants have “cut out” or stopped blooming due to drought stress or physiological maturity. If the weather is warm and rainy after an extended period of drought stress and cutout, the growth cycle can start again. One might see regrowth in the terminal and on many of the other nodes on the plant. Plants with unopened bolls or young, developing bolls are less likely to produce secondary growth. Regrowth is difficult to control because young foliage does not shed as easily as older leaves.

Spray Volume

Proper spray volume and coverage are also critical to the success of a harvest-aid program. Be sure to calibrate the sprayer to deliver the correct volume at the proper nozzle pressure to ensure adequate distribution and foliage penetration. **Read and follow the label directions for product use.** The harvest-aid label contains information based on many years of testing and results. Avoid applying on windy days to reduce the hazard of spray drift to non-target vegetation. Some harvest-aid

chemicals are very toxic and should be properly handled and stored, especially around small children and pets.

Harvest Aid Chemical Types

Harvest-aid products are broadly classed in three categories: desiccants, defoliant, and boll openers. Some can be classed as both desiccants and defoliant depending upon the rate used.

Desiccants

Desiccants generally are paraquat formulations and may contain various tank-mixes with other products. These products dry down the plant by causing the cells to rupture. The old rule of thumb is that desiccants are normally applied when approximately 80% of the productive bolls are open, or at two to three nodes above cracked boll. **Do not use paraquat-based desiccants when seedling-stage small grains or other crops are near targeted cotton fields. Paraquat drift can severely damage developing small grains grown for cover or harvest.** Gramoxone SL 2.0, Firestorm, and Parazone are similar products that have paraquat as the active ingredient. Paraquat applications made in the late afternoon before a bright, sunny day seem to boost the effectiveness of desiccation and tend to increase regrowth control. We suggest the use of nonionic surfactant (NIS) with paraquat. Use the NIS at a minimum rate of 0.125% or 0.25% volume/volume (v/v), depending on the percent concentration of surface-active agent (see individual product labels). You may need to increase the NIS rate to 1% v/v and spray late in the day to effectively desiccate some fields. In some years, protoporphyrinogen oxidase (PPO) inhibitor defoliant/desiccant products applied at **higher rates** work well to desiccate juvenile growth and regrowth, which is often difficult to do with paraquat. PPO inhibitor products include Aim, Display, ETX, and Sharpen. Unlike the problem with paraquat, drift from desiccant rates of PPO inhibitors should not injure small grains.

Defoliant

Defoliant cause plants to begin developing an “abscission layer” or zone of cells that eventually break down and cause leaves to separate from the stem and drop. Abscission is a natural process, but it is enhanced by the defoliant. Some defoliant are classified as hormonal, some are herbicidal, and some are mixtures of both. Hormonal defoliant work two ways: (1) they enhance production of ethylene, a plant senescence hormone that stimulates leaf abscission; or (2) they inhibit a plant’s ability to transport auxin, a plant growth hormone. Lower temperatures are more likely to reduce the effectiveness of hormonal defoliant than herbicidal defoliant. Hormonal defoliant include Dropp (thidiazuron) and related products. Because of cool fall temperatures, Dropp is not generally used in Oklahoma and north Texas. Herbicidal defoliant include Folex (tribufos) and related products, the PPO inhibitors (e.g. Aim, ETX, Display, and Sharpen), and low rates of paraquat or other desiccants (which at lower rates injure but

do not kill the leaves). Some products may have mixtures of both hormonal and herbicidal defoliants. These products include Ginstar (thidiazuron plus diuron and surfactants) and related products. To maximize leaf drop, defoliants require fairly healthy and active leaves that still function properly and are not severely drought stressed (tough and leathery). Warm air temperatures generally enhance a defoliant's effectiveness. According to the commonly used rule of thumb, defoliants can be safely applied when 50-60% of the bolls are open and the remaining bolls are mature enough to obtain a good yield. Defoliation generally assists in opening some mature bolls, but green, unopened bolls can still remain a challenge. Frequently, a killing freeze or a follow-up application of paraquat or other desiccant product is needed to allow stripper harvest of the crop.

Defoliant rates of PPO inhibitors disrupt plant cell membranes, triggering increased ethylene production in leaves and causing abscission. Research trials indicate that the PPO-inhibitor products can be effective defoliants, as well as effective desiccants in some instances when used at higher rates. These products tend to work equally well, but some may work better under certain crop conditions. PPO inhibitors can be tank-mixed with other products such as paraquat, Folex, Ginstar, Prep, Finish 6 Pro, CottonQuik, and various other ethephon-based products. We suggest the use of a crop oil concentrate (COC) for the Aim, ETX, and Display spray mixtures. Sharpen has special adjuvant needs which includes methylated seed oil (MSO) and ammonium sulfate (AMS). See specific product labels for details. **Failure to include proper adjuvants with these products will likely result in significantly reduced activity.**

Boll Openers - Ethephon

Ethephon-based boll-opener products increase the rate of boll opening and defoliation to allow for more rapid harvesting of the crop. Prep was the first ethephon-containing product in the cotton harvest aid market. It is no longer being produced by Bayer CropScience, however, other available generic ethephon products include Boll'd, Boll Buster, Setup, SuperBoll, and others. Several years ago, some enhanced boll-opener/defoliant products were introduced: Finish 6 Pro, which contains ethephon and cyclanilide; and CottonQuik, which contains ethephon and urea sulfate.

These products affect the natural boll-opening process, but they do not cause bolls or fiber to mature faster. Plants convert ethephon to ethylene, an aging-related hormone that speeds up abscission layer formation. Ethephon-based products usually reach a level of maximum effect within 14 days. This response is generally driven by temperatures. Tank mixes of ethephon and defoliants are effective at opening bolls and dropping leaves in higher yielding cotton. Higher rates of ethephon products alone are often very effective for defoliation, but lower rates are generally effective only for boll opening. The maximum labeled rate for ethephon products is 2 pounds of active ingredient per acre. Defoliant chemicals can be tank-mixed with ethephon products to enhance defoliation.

Boll Maturity and Ethephon

Ethephon must be applied to an active plant to be effective, and temperatures generally drive its effectiveness. Ethephon product labels generally state that plants need “sufficient mature unopened bolls present to produce desired crop.” Mature bolls are defined as “too hard to be dented when squeezed between the thumb and fingers, too hard to be sliced with a sharp knife, and when the seedcoat becomes light brown in color.” If you apply boll-opening products when bolls are not mature enough, you will likely see reduced lint yield and micronaire. Results from several Texas High Plains studies indicate that lint yield and micronaire reductions occurred when applications were made at 25% open bolls when compared to 50% open bolls. Lint yields were reduced at least 10%, and micronaire was decreased by about 5%. When one initially applies tank mixes of boll opener and defoliant products, one often needs a follow-up application of paraquat (or other product with desiccant activity) to sufficiently condition the cotton for stripper harvest. This step adds more expense to the overall harvest-aid program.

For late maturing cotton (defined as cotton still needing maturity, but the long-term average heat units have gone to zero) ethephon can be used as a conditioning treatment. Late maturing cotton will be susceptible to potential yield and quality losses if a hard freeze is encountered. **An unfortunate but necessary judgment call will have to be made concerning harvest aid application 7-10 days before a freeze, not the day before a freeze is forecast.** Ethephon must have at least 70 degree temperatures for several days in order to provide benefits with respect to boll opening and potential reduction of lint staining of unopened bolls which can occur after a freeze. Many times severe lint color degradation is observed after a freeze when prior to that a substantial number of unopened bolls remained in the field. Ethephon is ineffective AFTER a freeze based on the destruction of the physiological processes needed for benefit. Ethephon requires a functional plant. If a hard freeze is obtained, the plant is dead. One can apply ethephon at higher rates at least 7 days prior to a killing freeze in order to get some activity, assuming 70 degree temperatures can be obtained. It should be noted that if the anticipated freeze does not materialize, ethephon applied to immature cotton will potentially reduce yield and fiber maturity as measured by micronaire. This is one box we need to stay out of and why we encourage producers to manage for earliness. However, ultimately we are at the mercy of Mother Nature.

Quick Reference Decision Aid Tables

Many earlier planted fields are moving rapidly toward sufficient maturity to allow harvest aid application soon. The question remains what to use to bring down this cotton. I've always said that there is more than one way to get cotton harvest ready. What works this year may not work next year. It is very important to learn the strengths and weaknesses of the various products. Use rates, timing, weather, crop condition, etc. are all important for a successful harvest aid program.

A decision aid-table is provided for three projected lint yield levels (less than 500 lb/acre, 500+ lb/acre, and 1000+ lb/acre) and four scenarios (dry with temperatures less than 80 degrees 0-3 days after treatment; dry with temperatures greater than 80 degrees 0-3 days after treatment; and wet with temperatures less than 75 degrees 0-3 days after treatment; and late maturing). **Make sure to read the footnotes at the end of the publication, as they contain important information.** Due to the increased U.S. cotton acreage this year, some products may be more difficult to obtain in the marketplace than others. I have been discussing this in all meetings since early spring. The tables below are a worthwhile general guide because so many are available.

[For the 2017 Cotton Harvest-Aid Decision Table, click here.](#)

Harvesting Publications

Several publications have been generated by Cotton Incorporated in cooperation with a team of harvest engineers and agronomists. These include stripper harvesting, picker harvesting and seed cotton storage (module building). There is a huge amount of relevant information in these publications and they should not be overlooked, especially by inexperienced producers.

Producers need to put a lot of thought into module construction, module cover condition, site selection for module storage, and ground preparation for placing modules. There is a likelihood of substantial field storage time for cotton modules this year due to the large number of acres as well as anticipated good to excellent yields in many fields. **Many gins will be backed up for quite some time, and some modules could remain in fields for several months.** Be smart about module placement – make sure the site won't flood if extensive rainfall is encountered. It is imperative to keep watch on conventional module covers, and if necessary, these may need to be replaced if they get damaged by high winds or other environmental factors. Based on research conducted by Texas A&M AgriLife, lint value alone can be decreased by at least \$440 per module when using a poor cover. Wet modules can significantly reduce the bale throughput at the gin significantly, as well as cause serious problems with fiber and seed quality.

Click for:

[Stripper Harvesting](#)

[The Spindle-Type Cotton Harvester](#)

[Seed Cotton Handling and Storage](#)

For a brief but important discussion of the importance of maintaining the integrity of conventional module covers, click here:

[Cotton Module Covers Research](#)

Also, more information concerning cotton harvesting and economics of the two harvester types can be found on the Cotton Incorporated Website at:
[Cotton Inc - Cotton Harvest Cost Comparison Program/Decision Aid](#)

Lint Contamination – Continued Focus on Prevention

Two of the most important selling points of U.S. cotton in the export market include high quality fiber with minimal fiber contamination. The industry has worked hard over the past several decades to assure mills that we can provide them with fiber to meet their demands. Recently, I received a flyer from the National Cotton Council which discusses the importance of keeping this issue on the “front burner” with several segments of the industry. The ultimate goal is “contamination free” cotton. The paragraph below provides some of the discussion provided in the flyer:

Keeping cotton “contamination free” remains a high priority goal for the U.S. cotton industry. The National Cotton Council (NCC) is reaching out to growers, ginner and warehouse with the message about the critical importance of keeping U.S. cotton clean and pure. Please note that additional contamination prevention materials can be found on the NCC Quality Preservation web page.

For more information, click here: <http://www.cotton.org/tech/quality/index.cfm>

[To download a copy of the flyer, click here.](#)

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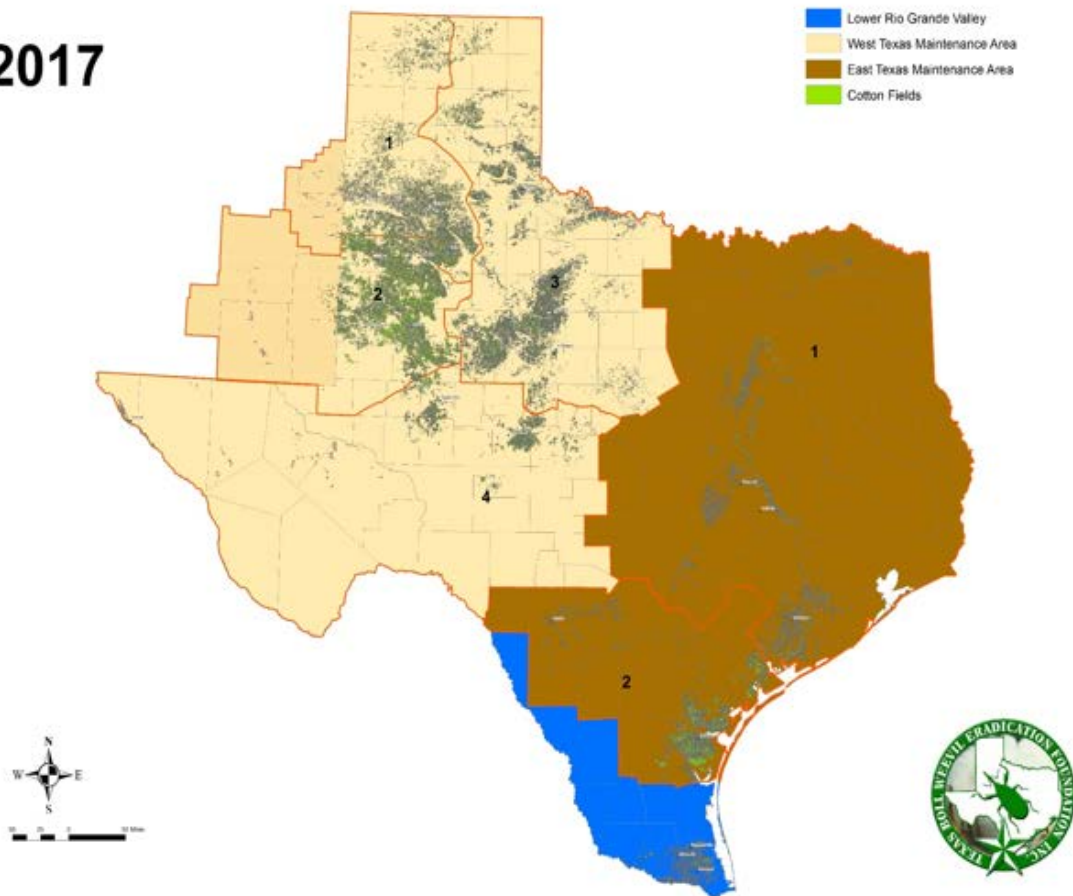
Oklahoma Boll Weevil Eradication Organization Update: Quarantine of Cotton Harvesting Equipment Coming From Certain Areas of Texas

John Henderson, Director of the Oklahoma Boll Weevil Organization, based at Altus, provided the information below. Eradication of the boll weevil across most of the U.S. Cotton Belt, and in the state has been very successful and is a major contributing factor to the continued profitability of cotton production. It has been a long, difficult, and expensive task to rid our state and most of the Cotton Belt of this invasive species that for such a long time negatively impacted our production. There is still a difficult fight with this insect pest in south Texas, and we all need to do our part in keeping this pest from resurfacing in our state.

Cotton harvesting equipment entering Oklahoma from two eradication areas in Texas has to be certified as boll weevil free prior to movement into our state. Please contact the Texas Boll Weevil Eradication Foundation (TBWEF) at least 48 hours in advance of

equipment departure from these two areas. This will allow TBWEF to inspect the equipment. A USDA-APHIS phytosanitary certificate is issued and is required before equipment can be transported from these areas. These ONLY include the Lower Rio Grande Valley Eradication Zone (blue area on the map below) or the East Texas Maintenance Area (brown area on the map below). This is critical to meet USDA-APHIS requirements and prevent the re-infestation of boll weevils into eradicated areas. It is illegal to move non-certified cotton harvesting equipment from these areas into the state of Oklahoma.

2017



Texas Boll Weevil Eradication Foundation: 325-672-2800
After Hours and Weekends: 325-668-7361

Oklahoma Boll Weevil Eradication Organization:
580-477-4280 Office
580-471-7962 John Henderson Cell

Upcoming Meetings

September 14th PhytoGen/Enlist field tour Shallowater, TX. [Click here for flyer.](#)

September 14th at 10:30 a.m. Burns Flat Community Center. For more information contact Brad Babek at 580-832-3356. [Click here for flyer.](#)

September 19th at noon – Great Plains Gin, Minco, OK. For more information contact Kyle Worthington at 405-262-0155. [Click here for flyer.](#)

September 21st – Carnegie Co-op Gin Fall Tour. For more information contact Jeannie Hileman at 580-654-1142 or David Nowlin at 405-247-3376.

September 21st – Caddo Research Station Field Day, Fort Cobb.

September 21st – Americot/NexGen Field Day, 10 a.m., AgriSearch Farm near Edmonson (Hale County). Questions: contact Jerry Montgomery, 806 577-8011.

September 23th – Deltapine Seminole Showcase Event, 11 a.m., Nichols Farm, 6 miles southwest of Seminole on FM 181. Questions: Eric Best, 806-790-4646.

September 26th – Deltapine Field Day, 11 a.m., Robbie Harkey Farm, Interstate 27 Exit 43, Hale Center. More information: Alyssa Spruill, (806) 500-5003.

September 26th – Americot/NexGen Lubbock/Lynn County Field Day, time TBA, Matt Caswell Farm. Questions: contact Jerry Montgomery, 806 577-8011.

September 28th – Bayer CropScience West Texas Field Day, location in the Lubbock area to be determined. Questions: contact Doug Cossey 580301-3060.

October 4th – Jackson County Cotton and Fall Cropping Systems Meeting. For more information contact Gary Strickland at 580-482-0823.

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Editor
Randy Boman

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