Cotton Comments

OSU Southwest Oklahoma Research and Extension Center
Altus, OK

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Crop Update

The 2014 Oklahoma cotton crop is off to a fair to good start in many places. With respect to precipitation, we are in good shape in many areas. We picked up another 0.9 inch at Altus this week. Over the past 3-4 weeks, we have had good to great rainfall over many areas (4-6+ inches). Unfortunately in eastern Tillman, southern Comanche, and Cotton counties, they have been on the very low side of that rainfall. We pretty much have everything planted, with stands in most fields.

Seedling disease issues have not been noted. Based on reports from producers it appears that overall thrips pressure has been relatively low. Thanks to good to excellent rainfall, we do have some weeds to beat back. We have been encouraging producers to use residual products with their glyphosate applications. Because of the recent rainfall, we expect a lot of weed/alternate host plant growth in which fleahopper populations can build. We have had some grasshopper populations show up, and growers are watching those. Hopefully the rainfall will trigger the fungus that works over the grasshopper populations. At Altus from May 1 through June 23, cotton DD60 heat unit accumulation totaled 845, about 15% above normal for that time period. We have some early planted (around April 30th) cotton in Harmon County that was at 1/3 grown square last week. The bad news is that we still have not had any substantial runoff for Lake Lugert, so we are still looking at no irrigation water for the District around Altus.

Lugert-Altus Reservoir is about 12% of capacity. Even though we have had some rainfall in the watershed, there has not been enough inflow to significantly improve the situation. At this time 2014 appears to be another year without irrigation water for the Lugert-Altus Irrigation District. Tom Steed Lake is now at just under 30%, which is an important improvement above the 21% level just a few weeks ago. June is an important runoff month and we have thus far not observed much inflow.

According to the June 22, 2014 National Agricultural Statistics Service (NASS) report, the Oklahoma crop condition was rated as 5% very poor or poor, with 42% fair, 52% good, and 1% excellent.

Plant Growth Regulators

With the excellent cotton in some areas where adequate moisture has been encountered, it will be important to be on point concerning the use of plant growth regulators. Mepiquat-based (such as Pix Plus, Mepex, Mepichlor, Mepiquat Chloride, Mepex GinOut, Stance, and others) plant growth regulators (PGRs) have been around for many years. Companies are constantly enhancing formulations, but the main active ingredient in nearly all of these products is mepiquat chloride.

Mepiquat chloride (MC) reduces production of gibberellic acid in plant cells that in turn reduces cell expansion, ultimately resulting in shorter internode length. MC will not help the plants compensate for earlier weather or disease damage. It does not increase growth rate, it essentially reduces plant size by reducing cellular expansion. It may, under good growing conditions, increase fruit retention, control growth and promote earliness. **MC should not be applied if crop is under any stresses including moisture; weather; severe spider mite, insect, or nematode damage; disease stress; herbicide injury including 2,4-D damage due to drift or from tank contamination; or fertility stress.**

Results from replicated testing indicates that a 5 to 20% reduction in plant height (compared to the control) can be obtained from 16 oz of 4.2% a.i. MC material applied in up to 4 sequential 4-oz/acre applications starting at match head square (MHS) and ending at early bloom. It is generally possible to reduce about one node from the growth of the main stem, which can result in about 3-5 days earlier cutout. **Low rate multiple applications beginning at MHS have generally provided more growth control than later higher rate applications made at first bloom or later.** Results have shown that statistically significant increases in yields are generally not obtained, but excellent growth control is provided. Many times we don't see a lot of differences in performance of these products when comes to growth control.

Available Products

Mepiquat based products have been around for many years. Several PGRs based on the same active ingredient are now available. Refer to the product labels or contact Extension personnel or company representatives or to ensure you understand the correct use of these products.

Mepex, Mepichlor, Mepiquat Chloride and other generics
4.2% active ingredient (a.i.)/gallon or 0.35 lb/gallon a.i.

Mepex Gin Out
4.2% a.i./gallon or 0.35 lb/gallon a.i. with 0.0025% Kinetin (a cytokinin).
Cytokinins are plant hormones that promote cell division and growth and delay the senescence of leaves. This product has use guidelines similar to other MC materials.

Pentia
Has a different molecular structure than MC (mepiquat pentaborate).
9.6% a.i./gallon or 0.82 lb/gallon a.i. Typically Pentia has similar use rates when compared to 4.2% MC products.

Stance
Bayer CropScience's Stance product is an MC based PGR. It is a 4 to 1 ratio of MC and cyclanilide (0.736 lbs/gallon MC plus 0.184 lbs/gallon cyclanilide). Cyclanilide is an auxin synthesis and transport inhibitor. Auxins are generally referred to as compounds which have the capacity to induce cell elongation. The inhibition of auxins could reduce cell elongation and inhibit growth. **Producers should be aware that the mepiquat chloride concentration in Stance is about twice as high as most of the other materials we have become accustomed to applying. THEREFORE THERE IS A CORRESPONDING REDUCED RATE.**

What to Expect From Application

Consistent yield increases have not been observed from any of the MC materials we have investigated. A good boll load will normally help control plant growth. Fields with poor early-season fruit retention, excellent soil moisture, and high nitrogen fertility status may be candidates for poor vegetative/fruiting balance and should be watched carefully. Growers who have planted varieties with vigorous growth potential and have fields with excellent growing conditions may need to consider PGR application. For brush roll header stripper harvest, 28-32 inch tall plants optimize stripper-harvesting efficiency. If possible, target a maximum plant size of about 32 inches for varieties under high input irrigation (sub-surface drip or high capacity pivots). If plants get larger than 36 inches, harvest efficiency and productivity drop significantly. For spindle picker harvesters, larger plant size for high yielding cotton is not as much of a harvesting consideration. **Pickers can handle higher yielding, taller plants with much greater ease than stripper harvesters, especially when the stalks are still alive (or “green”). However, if weather constraints at harvest time delay harvesting after freezing weather, the large brittle plants can still result in picker harvesting difficulties.**

Application Rates and Production Environment

Determination of application rates is generally more "art" than "science" for these products. Applications should begin when 50% of the plants have one or more matchhead squares (see specific product label for more information). It is best to get a handle on excessive growth potential early if conditions favor excessive growth for an extended period of time. Herein lies an important dilemma: It is unknown at that time as to how weather will affect the crop in July and on into early August. Will we get 100+ degree temperatures, southwest winds at 30 mph at 10% relative humidity? If so, those conditions will limit plant growth in many fields with low irrigation capacity. Watch high growth potential varieties and fruit retention. If a high growth potential variety has been

planted and has encountered low fruit retention, then MC rate should be increased, especially under high water, fertility, and good growth conditions. One should target applications to fields with high growth potential. Some newer varieties may need aggressive management under high irrigation capacity and/or if heavy rainfall conditions are encountered. The situation that has arisen due to the release and availability of new genetics is challenging. Visit with your seed company representative to determine which new varieties should be watched closely for MC needs under field-specific conditions. Sequential applications can be adjusted to meet subsequent crop conditions and growth potential. For more information concerning PGR use, use the link below.

Click here for Cotton Growth Regulators – Producer Handout
This publication includes a list of newer varieties, their growth habits, and potential PGR management concerns.

Plant Monitoring

A considerable amount of cotton is beginning to square and normally it takes about 21 days for a pinhead square to develop into a bloom. Retaining early fruit is an important component of managing for earliness. During the pre-bloom period, we like to see at least 75-85% square retention. Hopefully well maintained fields will retain nearly 100% of pre-bloom squares. Monitoring fruiting is an important management consideration. First position fruit is very quickly counted, and is generally adequate for "getting a handle on the crop" (see Figure 1). It will be important to check fields for nodes above white flower (NAWF) at early bloom to assess the yield potential and vigor at that time. At early bloom, up to 80% of the harvestable crop will be on the plant in the form of squares and blooms. We like to see at least 85% square retention going into the first week of bloom. Plant mapping can be used to help monitor the progress of the crop and determine some important crop factors.

Important plant mapping data at early bloom are:

1. Total 1st position squares present and missing: (retained squares / total square sites = % square retention). Square retention goal is 75 - 85% 14 days after early bloom.

2. Total 1st position bolls present and missing: (retained bolls / total boll sites = % boll retention)

3. Nodes above white flower (NAWF). To determine NAWF see Figure 2.

Nodes above white flower at first bloom gives an indication of crop vigor and yield potential. Typically, NAWF should be high at first bloom and then decrease as the boll load ties down the plant, and mainstem node production rate slows or ceases. Greater than 8 NAWF could be considered excellent, 6-7 – reduced yield potential possible unless adequate irrigation is quickly initiated or rainfall is obtained, 4-5 or less - cutout

imminent on more determinate varieties. Many fields that are stressed for moisture may have a short bloom period due to few NAWF at early bloom, unless timely rainfall or irrigation is obtained. **It will be important to track NAWF averages weekly for each field, as key management decisions later in the season can be assisted if the hard cutout date is known.**

Figure 1. Early bloom plant mapping using first position fruiting sites.

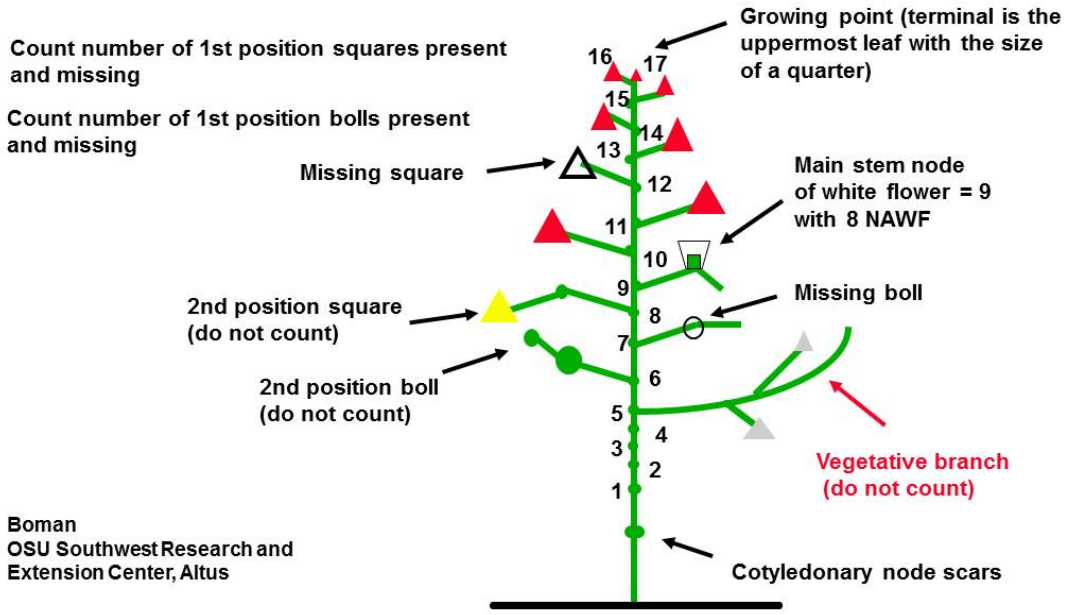
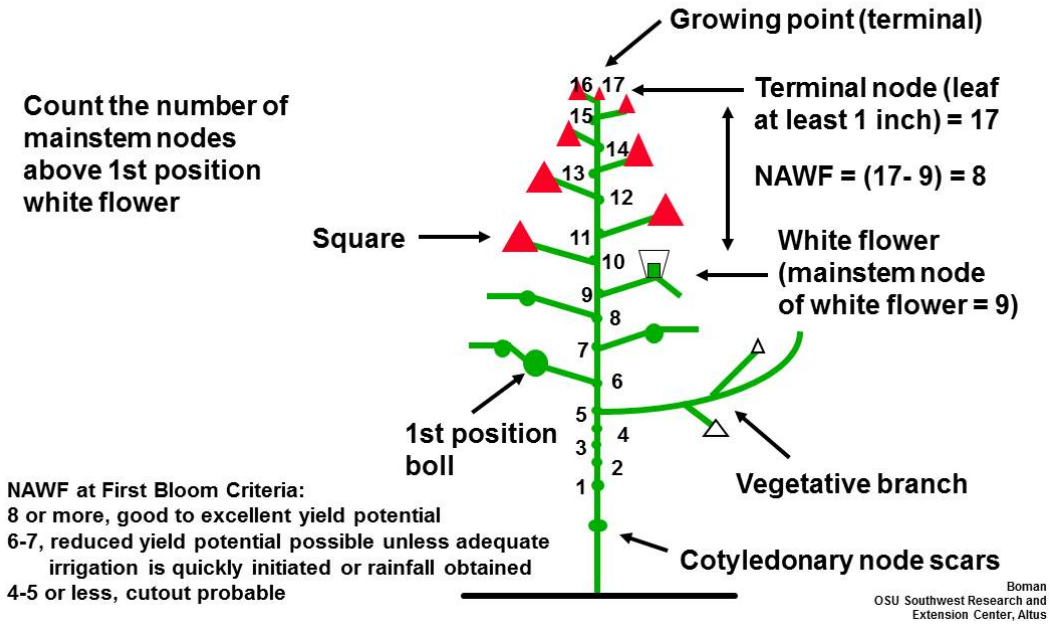


Figure 2. Nodes above white flower at early to mid-bloom.



Click here for a publication on Monitoring Cotton Pre-Bloom Fruiting In Oklahoma.

Click here for a publication on Monitoring Cotton Post-Bloom Fruiting in Oklahoma. (This publication discusses the importance and utility of tracking nodes above white flower.)

Click here for a Nodes Above White Flower Tracking Form.

Nitrogen Fertility

A one-bale per acre cotton crop will remove about 45 lb of actual N per acre, but due to inefficiencies in uptake and in the soil, about 50 lb N/acre are actually required. Recently, the OSU recommendations have been reduced from 60 lb N per bale of yield goal to to 50 lb N per bale. For a copy of the OSU Fact Sheet where this is discussed and justified, use the link below.

Click here for Cotton Yield Goal – Nitrogen Rate Recommendation PSS2158

It is important to not over fertilize with N. This is due to the fact that it makes late cotton more difficult to manage on the back side of the season and may complicate earliness and harvest aid performance. Some late-season insect problems, such as aphids, can be aggravated by high N status plants, and incidence of Verticillium wilt may be increased. Excessive N in general can also result in delayed maturity with corresponding decreases in maturity of the fiber (micronaire). I seriously doubt that any high capacity irrigated field really needs more than about 175 total lbs N/acre for yields up to four bales/acre. That amount would also include any preplant residual nitrate-N to the 24 inch depth as well as from irrigation water. If irrigation water contains 10 ppm nitrate-N and 12 acre-inches are applied, this will provide 27 lbs N/acre to the crop during irrigation. Producers with alluvial aquifers such as the high nitrate Tillman Terrace should have their irrigation water tested and adjust fertilizer N rates accordingly. For a handout on the amount of N supplied by various irrigation amounts and water nitrate-N concentrations, use the following link.

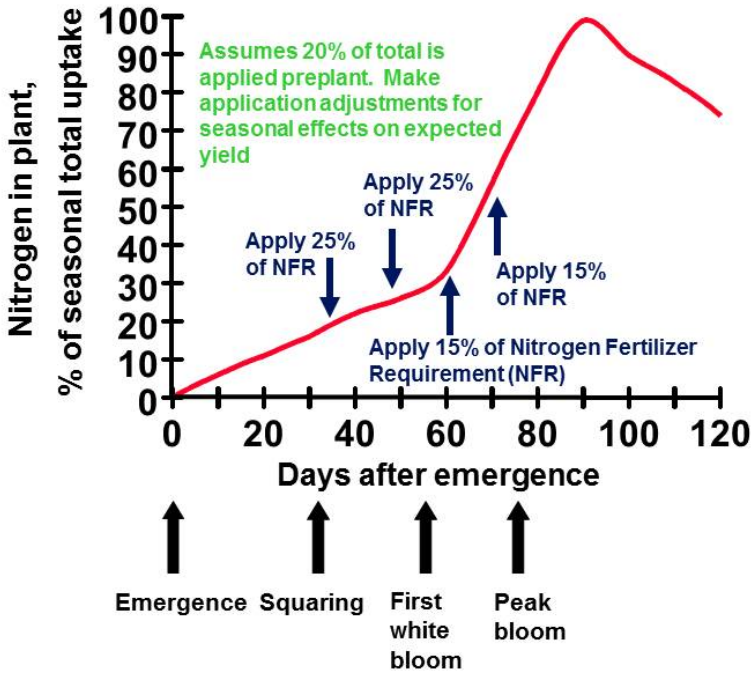
Click here for Nitrogen Amount in Irrigation Water

The amount of organic residue of the previous crop is also important and will potentially adversely affect nitrogen availability. In no-till fields with a large amount of crop residue the N rate should be increased by 20 to 30 lbs of N per acre when fertilizer is surface applied. This will compensate for the N tied up in the residue due to immobilization. For those producers who have dryland cotton with optimism for good yield potential, fertilization should be performed soon. One way to accomplish this is to sidedress urea-ammonium nitrate (UAN - fluid 32-0-0) fertilizers as early as practical (but prior to bloom), and take care to minimize root pruning during knife application about 4-5 inches

deep about 8 inches or so off to the side of the row. Applications could also be made in the furrow, but it is important to recognize that crop rooting will have to extend quite a ways toward the furrow for uptake. If 32-0-0 is dribbled in the furrow, make sure to keep the fertilizer off the young plants, as fertilizer burn damage can be expected. Solid urea (46-0-0) can be broadcast applied. Rainfall or irrigation will be required to provide activation of any fertilizer application. If no rainfall occurs, no fertilizer uptake can be expected.

Fertigation of 32-0-0 is a practical application method especially in center pivot and subsurface drip irrigated fields. This results in lower application cost. If a pivot rigged with spray nozzles has marginal water quality and extremely hot, dry conditions are encountered, then some salt burn may be encountered on foliage. To obtain maximum utilization of applied N, the total amount of N should probably be injected between first square and peak bloom. This type of N management fertigation scenario has been used and validated for several years at the Texas A&M System research facilities at Lamesa AG-CARES and Halfway Helms Farm using alternate furrow LEPA irrigation. Figure 3 shows a typical N uptake curve for cotton and corresponding crop development stages. Suggestions for applications of approximate percentages of total N are also shown.

Figure 3. N fertigation strategy.



A knifing rig fitted with coulters would be a good way to accomplish N fertilization in fields with center pivots if fertigation injectors and tanks are not available. Apply the fertilizer to the side of the bed for fields with center pivots. For producers who are not injecting N fertilizer into their sub-surface drip irrigation systems, place the coulters to the side of the bed in the furrow with the drip tape, being extremely careful not to

damage the tape. Since most drip tape has been placed 10-14 inches or so deep, placement of N fertilizer 4-5 inches deep should suffice.

Many producers may be tempted to cut fertilizer use by a certain percent or to use a gallon per acre of this or gallon per acre of that to replace a sound fertilizer program. Benefits from low rates of foliar fertilizers are questionable unless there is indeed a micronutrient deficiency and the product applied contains the deficient element. The cotton plant has a physiological need for nutrients. These nutrients have to come from somewhere if good to excellent yields are to be expected. If one does the math concerning what some of the "gallon per acre" products can supply, then it is fairly easy to determine that these products will not meet the needs of the crop. And they could be very expensive when comparing the "program price" with how many pounds of N the same money could buy using conventional fertilizers. If good to excellent yields are obtained after cutting back on a recommended fertilizer management program, then the producer is actually "writing checks on the checking account" in the soil. If no deposits are made over time, then a shortage of fertility will occur and yields will be adversely affected.

RB

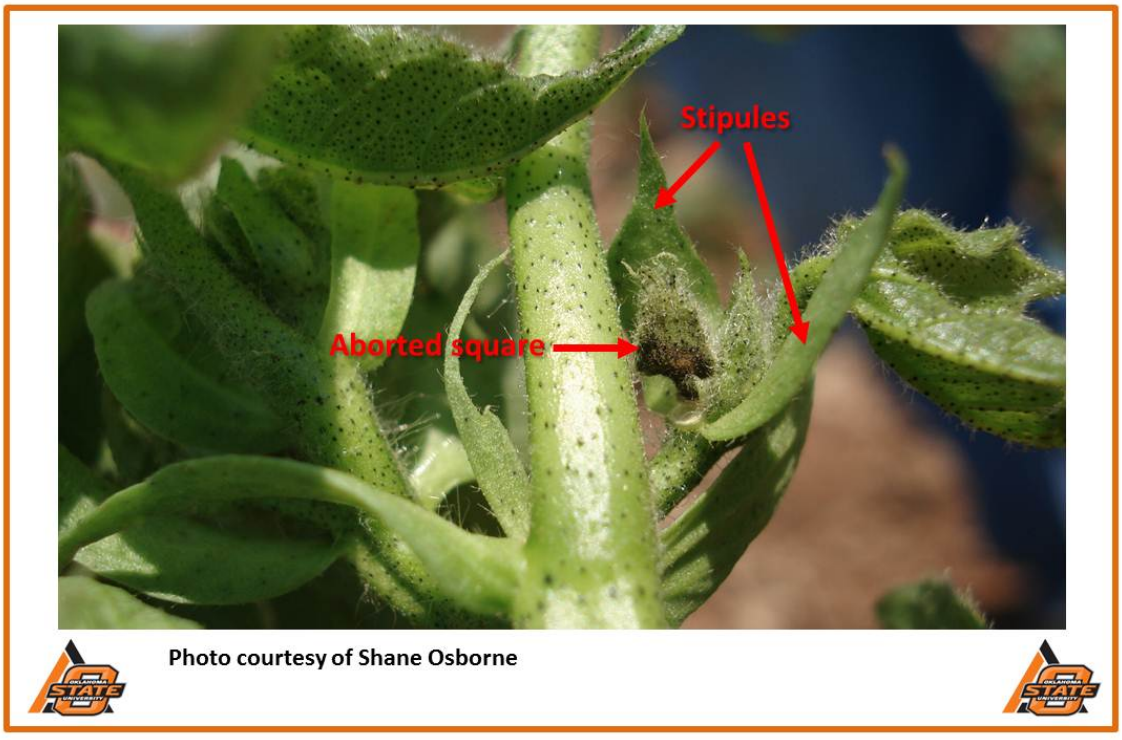
Early Season Pests – Fleahoppers and Lygus

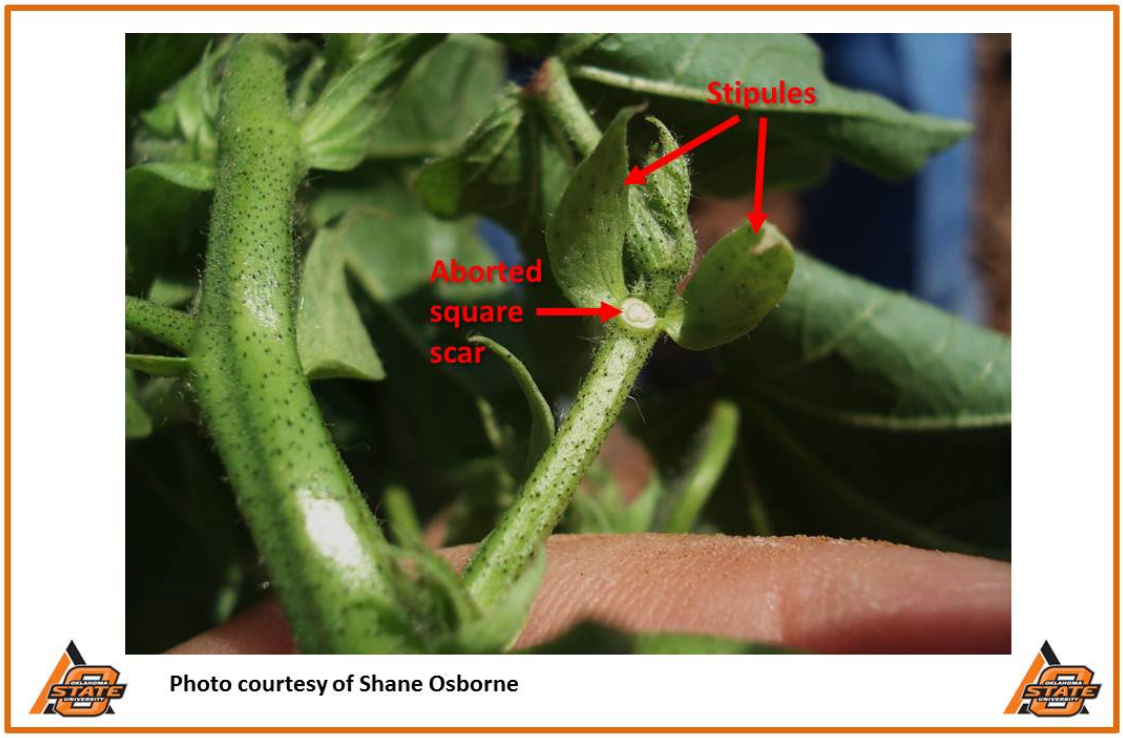
Cotton Fleahoppers and Lygus are the next pests to start monitoring during the fruiting stage of the cotton crop (squaring to bloom). This year the crop is developing in some areas exceedingly well whereas a few fields seem to be “slow”. Several factors are occurring in these problem fields hopefully with the recent rainfall and normal temperatures these will solve the problems. Most scouting program fields indicated that thrips are no longer an issue because of growth stage (5th true leaf). Conversations with chemical distributors and consultants have indicated that no problems are generally occurring. However, due to the lateness of planting of many dryland fields due, those should be watched. As the crop reaches the squaring stage, the next pest to be concerned about is the cotton fleahopper.

Cotton Fleahopper

Since the introduction of Bt cotton and boll weevil eradication the cotton fleahopper has become the number one pest in Oklahoma. The cotton fleahopper usually feeds on young succulent weeds such as croton, goatweed, and horsenettle in early spring. These weeds also provide an overwintering site for eggs. As the weeds mature, adults migrate to cotton which is beginning to develop pinhead squares. Fleahoppers insert their sucking mouthparts into the small squares. These damaged squares later turn brown and are shed from the plant.

Photos courtesy Dr. David Kerns, LSU AgCenter, formerly Texas A&M AgriLife Extension, Lubbock.





In addition to squares, the cotton fleahopper will also feed on other parts of the plant. If heavy infestations exist, new growth will be abnormal and whip-like in appearance. All stages of the life cycle will feed on the plant as long as it remains succulent. As cotton matures, these insects migrate to weeds or other host crops. In southwest Oklahoma, the highest population typically occurs in cotton in early August, although this is not generally a problem that late in the season.

The life cycle begins with the female placing her eggs into the plant tissue by means of an ovipositor. The eggs hatch in approximately 1 week, and small nymphs (which are similar to the adults, except for being wingless) undergo five molts before reaching the adult stage. Egg to adult takes approximately 3 weeks with six to eight generations per year. The cotton fleahopper adults are approximately one-eighth inch long, winged, and pale green in color. They are covered with small black spots and have four characteristic black spots near the wing tip. The nymphs are about one-twenty-fifth of an inch long, wingless, and pale green in color.

Numerous chemicals are registered for control of fleahoppers. In an ideal situation, fleahoppers should be controlled only when thresholds are exceeded in order to preserve beneficial insects since these will help control later occurring pests. Unless the cotton is extremely late, after July 25, control of cotton fleahoppers generally is not economical.

Spray decisions should be based on the squaring rate and level of cotton fleahopper infestations. Usually when cotton fleahoppers (adults and nymphs) reach or exceed 30 per 100 terminals and squaring rates begin to decline, treatment is justified. However, if cotton fleahopper numbers build slowly, fields can tolerate higher numbers before a reduction in squaring rate will occur. In most cases, fields will no longer be vulnerable to cotton fleahoppers once they begin to bloom.

Chemical control of cotton fleahoppers is a fairly easy to accomplish and several products provide good control. However certain chemicals may not be advantageous. Care must be taken to preserve beneficial insects that will help in controlling cotton aphids and spider mites. Flaring of these pests can be avoided by using products that are “easier” on beneficial insects.

The list of chemicals that control cotton fleahoppers includes Vydate, Orthene, Bidrin, Intruder, Centric, Trimax Pro, Carbine, Lorsban, Steward, Lannate, Dimethoate, and various pyrethroids. Bidrin has a label allowing its use in cotton from emergence to prebloom, but you can’t apply more than 3.2 oz/ac during this period. According to research conducted by Texas A&M AgriLife Extension at Lubbock, products least likely to flare secondary pests include Carbine, Bidrin, Steward and low rates of Orthene. Other insecticides such as Intruder, Centric and Trimax Pro won’t flare aphids and are probably fine to use as well, but have been implicated in flaring mites. Pyrethroids are typically not recommended for fleahopper control because they tend to be very disruptive and may flare aphids and bollworms in non-Bt cotton.

Lygus

Lygus although far less numerous than cotton fleahoppers are a growing concern of late due to less chemical applications because of transgenic Bt cotton and boll weevil eradication. Economic infestations in Oklahoma have not yet been noted by Extension personnel.

Lygus or plant bugs are small insects that 0.25 inch long and 0.1 inch wide, and flattened on the back. They vary in color from pale green to yellowish brown with reddish brown to black markings, and have a conspicuous triangle in the center of the back.

Texas A&M AgriLife Research and Extension personnel have identified three species of lygus that are predominate in cotton in this region: the western tarnished plant bug, the tarnished plant bug and the pale legume plant bug. It is normally not necessary to distinguish between these species in making management decisions.

Photos courtesy of UC Davis

Plant bugs feeds on many alternate hosts such as alfalfa and other legumes, butterweed, fleabane, goldenrod, aster, and dog fennel. When the weed host becomes unsatisfactory for feeding purposes, plant bugs usually migrate to cotton fields. The average time to complete the life cycle is 50 days in summer. Plant bugs can generate four to seven generations in one season.

Development time of each stage varies with temperature. Under normal temperatures this is about 7 days for eggs, 7 days for small nymphs (instars 1–3), and 7 days for large nymphs (instars 4 and 5).

Plant bugs feed by inserting mouthparts into terminals, squares, and other tissues, and by sucking the juices out. Injured squares usually turn dark and drop off, while damaged bolls may develop abnormally.

Control of Lygus, although rare in Oklahoma, must be carefully considered because of the destruction of beneficial insects that could cause outbreaks of other pests especially cotton aphids. Texas A&M AgriLife Extension at Lubbock has provided a threshold table.

Lygus Action Threshold

	Sampling method*	
Cotton stage	**Drop cloth**	**Sweep net**
1st two weeks of squaring	1-2 per 6 ft-row with unacceptable square set	8 per 100 sweeps with unacceptable square set
3rd week of squaring to 1st bloom	2 per 6 ft-row with unacceptable square set	15 per 100 sweeps with unacceptable square set
After peak bloom	4 per 6 ft-row with unacceptable fruit set the first 4-5 weeks	15- 20 per 100 sweeps with unacceptable fruit set first 4-5 weeks

*Sweep net – standard 15-inch net, sample 1-row at a time taking 15-25 sweeps. Recommended before peak bloom.

Drop cloth – black is recommended; 3-ft sampling area, sample 2-rows. Recommended after peak bloom.

Cease sampling and treating when NAWF = 5+ 350 DD60's.

If one encounters a lygus population above economic thresholds the same precautions should be considered as those for cotton fleahopper control. Also, damage occurring with the presence of lygus does not necessarily mean chemical control is warranted. Based on research conducted in the Texas High Plains by Dr. David Kerns, Orthene, Vydate, Carbine, and pyrethroids could be considered. He suggested not to use pyrethroids if aphids are present because of threat of aphid flareup. Orthene at 0.75-1.0 lb/acre will provide excellent control. If aphids or mites are present Carbine may be used since it can provide effective control and is easy on most beneficial arthropods. Vydate at 13-17 oz/acre performed well in his trials.

JG

Field Surveys in Oklahoma - Week Ending June 27, 2014

Location	Date of planting	Plant Stage	Insects	Comments
Beckham Irrigated RACE - Damron	May 20	Pinhead Squaring	None detected	Good
Caddo Irrigated Cotton Inc Enhanced Variety - Schantz	May 20	Pinhead Squaring	None detected	Good
Caddo Irrigated Bayer CAP - Schantz	May 21	NA	NA	Road to trial impassable
Caddo K Trial - Schantz	May 21	NA	NA	Road to trial impassable
Caddo Irrigated Dow Innovation - Schantz	May 31	4th True-leaf	None detected	Good
Caddo Irrigated Americot ACRE- Schantz	May 31	4th True-leaf	None detected	Good
Caddo Irrigated OVT – OSU Station	June 3	5th True-leaf	None detected	Good
Caddo Irrigated Regulated Trials – OSU Station	June 2	3th True-leaf	None detected	Good
Harmon Irrigated Cotton Inc Enhanced Variety - Cox	May 21	Pinhead Squaring	None detected	Good
Harmon Irrigated Bayer CAP – Horton	April 30	Pre-bloom	None detected	Good
Jackson Irrigated RACE – Darby	May 21	Pre-squaring	None detected	Good
Jackson Irrigated OVT - Altus Station (no water)	June 2	4th True-leaf	None detected	Good
Jackson Dryland Race - Abernathy	June 13	1st True-leaf	None detected	Good
Jackson Irrigated Weed Control Trials - Altus Station (no water)	June 4	4th True-leaf	None detected	Good
Tillman Irrigated RACE – McCullough	May 15	Pre-squaring	None detected	Good
Tillman Irrigated Trials – Bayer CropScience Thrips - McCullough	May 14	Pre-squaring	None detected	Good
Tillman Drland RACE - Fischer	June 5	4th True-leaf	None detected	Good
Tillman Dryland No-Till (Tipton Station)	June 6	4th True-leaf	None detected	Good
Tillman Dryland OVT - (Tipton Station)	June 4	4th True-leaf	None detected	Good
Washita Dryland RACE - Davis	June 4	4th True-leaf	None detected	Good

RACE – Replicated Agronomic Cotton Evaluation Trial (Oklahoma Cooperative Extension)
CAP – Cotton Agronomic Plot (Bayer CropScience)
OVT – Official Variety Trial (Oklahoma Agricultural Experiment Station, Altus, Tipton, Fort Cobb)

Pigweed Control Issues

There have been some recent reports from grower's having difficulty controlling pigweed. These reports have been growing over the last few years and in some instances growers may have attributed lack of control to drought conditions instead of resistance. Unfortunately this may have prevented them from adopting or implementing the appropriate residual herbicide program necessary to prevent future problems. Since recent rainfall events have provided adequate moisture and good growing conditions, difficulties experienced now will most likely be attributed to one of two things, either application error or actual glyphosate resistance. The best way to prevent this from occurring in our area is to use multiple herbicides with varying modes of action. This includes NOT relying solely on glyphosate as your only weed control option in-season. **It is recommended that producers try to include at least two additional different modes of action besides glyphosate.**

Click here to view Herbicide Program Suggestions for Fighting/Preventing Glyphosate Resistant Pigweed In Oklahoma Cotton. Read and follow label instructions for all products listed. Effective weed control begins with reading the product label.

For discussion of the following herbicide management topics, see the June 9th edition of this newsletter.

Staple Herbicide-Glyphosate Herbicide Tank Mix and Staple Alone

Liberty 280 SL Herbicide on Liberty Link Cotton

Dual Magnum Herbicide (S-Metolachlor)/Glyphosate Tank Mixes for Roundup Ready and Roundup Ready Flex Cotton

Warrant Herbicide

Prowl H2O Herbicide

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