



# Cotton Comments

OSU Southwest Oklahoma Research and Extension Center  
Altus, OK



June 7, 2012

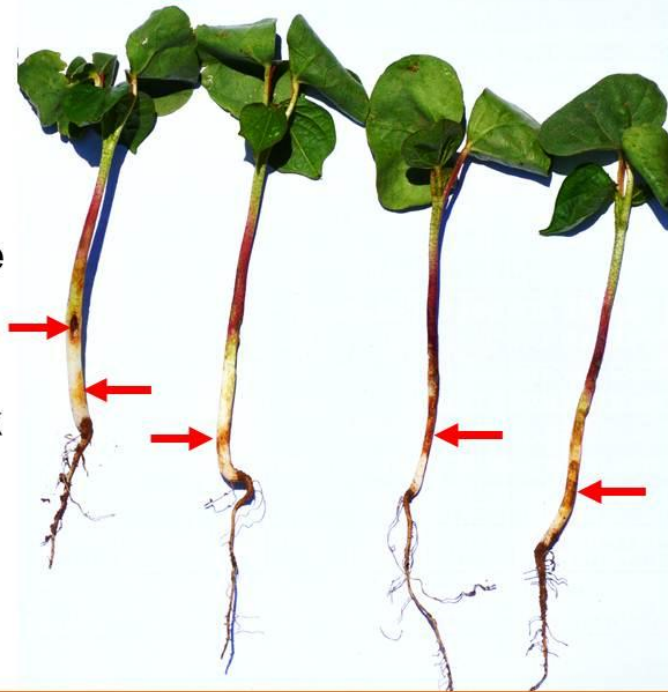
Volume 2 Edition 6

## Crop Update

The 2012 Oklahoma cotton crop is off to a relatively good start in many places. Although effects of the 2011 Drought still linger in some areas, there is no doubt that conditions are more favorable for most producers than in 2011. According to the June 4, 2012 National Agricultural Statistics Service (NASS) report, Oklahoma had planted 63% of its acreage, compared to a 5-year (2007-2011) average of about 62%. Most irrigated cotton is up to a good stand, with many of these acres planted from early to late May. Some earlier planted cotton is up to the 8-9 leaf stage, with some presenting pinhead squares. Mid-May planted cotton is typically in the 4-5 leaf stage. Most of the remaining acreage is dryland with poor or variable moisture. With crop insurance final planting date deadlines for non-irrigated cotton looming (June 10 for northern counties, June 20 for southern counties), producers are watching the skies hoping for rain in unplanted areas. A multitude of recent spotty rainfall events have provided sub-par to good moisture conditions, depending upon the location. Based on Mesonet observations, over the last 30 days, total rainfall amounts in southwestern Oklahoma have ranged from 2.66 inches at Grandfield to 4.19 inches at Mangum. Higher rainfall amounts have been noted closer to the Oklahoma City area. The bad news is that for the month of May, Altus normal rainfall is 4.81 inches, but we received only 1.82 inches in 2012. In addition, Altus has already had 12 days of 100 or greater - 1 in April, 9 in May, 2 in June. During May, Altus also experienced 7 days with wind gusts over 40 mph, and most of those days coincided with the extremely high temperatures. Planter adjustment during that period was difficult at best. Timely rainfall on May 19<sup>th</sup> and 20<sup>th</sup> provided a safety valve to cover up planting issues and good stands were obtained. *Rhizoctonia* and perhaps *Pythium* seedling disease issues have been encountered in some fields resulting in slower than normal growth. This has occurred even with generally warm soil temperatures. Based on conditions, it is unlikely we will have substantial stand loss even though the seedling disease is there. From May 1 thru June 4, cotton DD60 heat unit accumulation totaled 590, about 56% above normal for that time period. Lugert-Altus Reservoir is about 23% of capacity, which is the lowest amount at the end of May since 1993 (no earlier records available to me). Even though we have had some rainfall in the watershed, there has not been enough inflow to improve the situation. June is an important runoff month and it is desperately needed at this time.

## Seedling Disease

- Hypocotyl discoloration due to *Rhizoctonia* infection
- Can result in lack of vigor



### Making Replant Decisions

Thunderstorms have wreaked havoc with stands in some areas. Because of this it is important to inspect fields to determine the amount of damage or if excessive stand loss occurred. Replanting decisions vary from field to field. Many times after violent thunderstorms it is important to get a handle on the root health of the plants, stem bruising, etc. Once we get near the final planting date for insurance purposes, it becomes critical to evaluate the stand situation, as the amount of stand loss and yield potential needs to be compared to the yield loss potential arising from late planting. We are at a disadvantage because we can't necessarily predict the actual first freeze date in the fall. However, based results from a long-term irrigated cotton date of planting project conducted at the OSU Southwest Research and Extension Center at Altus, yield potential drops precipitously after June 15. The final planting dates for insurance purposes for dryland in most southern Oklahoma counties are June 20. Typically, dryland production is lower and it's easier to mature a lower yield crop with later planting or replanting.

A while back, we developed a publication concerning the difficult replant decision making process. Although a Texas publication, I believe the criteria for southwestern Oklahoma are similar.

[Click here to view Making Replant Decisions in Cotton -2007](#)

### **Spray or Nurse Tank Cleanout Concerns**

We perennially begin to get phone calls this time of year and make field inspections concerning hormone-type herbicide damage on cotton. Typical phenoxy herbicide symptomology includes “strapping of leaves.” Based on field research conducted by Dr. Wayne Keeling at the Texas AgriLife Research and Extension Center at Lubbock, the severity of yield decrease is related to the actual dose and the crop stage. Severe damage incurred when the crop begins to fruit is more likely to reduce yield than when the crop is younger with less severe damage. Doses of sufficient level to continue “strapping” of newer leaves for weeks after application will probably significantly negatively impact yield.

Producers should be aware, especially in light of the “tank and hose cleaning ability” of some of the newer herbicides, that phenoxy residue in sprayers can be a real problem. My suggestion for our growers is that tanks, hoses, and sprayers which are used for applying phenoxy type herbicides be dedicated SOLELY to that purpose. If producers are unable to purchase separate tanks, hoses and/or sprayers, then it is imperative that several issues be addressed. Do not leave herbicides in tanks for an extended period of time. Chemical induction tanks installed on nurse tanks can also get contaminated and cause problems. It is best to use “chemical resistant” hoses. Replace hoses when changing out tanks. The last thing a cotton field needs is for a phenoxy material (even at low concentrations) to get “pulled from the tank or hoses” and get sprayed on cotton – especially those fields with high yield potential (i.e. subsurface drip or high capacity pivots). If multiple herbicides are used in the sprayer, then I suggest that producers purchase various tank cleaning agents from their dealers and follow the directions, including cleaner concentration, religiously. If a tank/sprayer is to be used on cotton, I suggest that the tank be flushed out with clean water and the appropriate tank cleaner be mixed at the appropriate concentration. The producer should then spray the cleaning solution through the booms and nozzles. Leave the booms in a horizontal position and let the cleaning solution sit in the tank at least overnight. This might help reduce some anxiety over phenoxy damage later. It doesn’t take very many lost bales of production to pay for an additional tank and hoses or sprayer.

For an excellent University of Missouri publication on cleaning sprayers, go to this link:

[Click here for University of Missouri publication On Cleaning Sprayers](#)

This publication has good information concerning herbicides, recommended cleaning solutions and sensitive crops.

## Glyphosate Issues

Several states now have confirmed glyphosate resistant palmer amaranth. Dr. Bob Nichols with Cotton Incorporated worked with a team of weed scientists from across the U.S. and assembled an excellent publication concerning weed resistance in cotton.

[Click here to view Managing Herbicide Resistance in Cotton Cropping Systems](#)

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 incorporate at least two additional different modes of action besides glyphosate.**

Page 18 of the Roundup Power Max label (in the section for Roundup Ready Flex cotton) provides a list of herbicide products that can be tank mixed and applied post emergence over-the-top (OT), and a list that can be tank mixed and applied using post-directed or hooded sprayers in Roundup Ready Flex cotton varieties. Page 18 also provides the maximum application rates for Roundup Ready Flex cotton. The total for all in-crop applications (from ground cracking through 60 percent open bolls) is 4 quarts per acre. Caution should be taken to not allow larger weed size to cause yield losses from early season competition. **In order to provide optimal control and help prevent weed resistance, do not apply a below label recommended rate.**

### Staple Herbicide-Glyphosate Herbicide Tank Mix and Staple Alone

Significant label restrictions for rotational crops are noted when Staple applications are made. These crops include but are not limited to wheat; field corn, corn grown for grain or silage; grain sorghum; peanuts; soybeans. These restrictions do not apply for fields in continuous cotton production.

According to the label, in Oklahoma, Staple LX herbicide at 1.3 – 3.2 oz/acre can be added to the first OT application of glyphosate at 24-32 oz/acre (of 4 lb a.i./gallon glyphosate product) may enhance control of several annual weed species including hemp sesbania, morningglory (entireleaf, ivyleaf, pitted, scarlet/red), cutleaf evening primrose, prickly sida and palmer amaranth (pigweed). Glyphosate rates are based on 4 lb active ingredient per gallon formulation. For other glyphosate formulations, rates should be adjusted proportionally to the active ingredient content of the formulation.

For higher residual control, a single application of ONLY Staple LX can enhance morning glory control at rates of 2.6 to 3.8 fl oz/acre of product. The label states “Apply Staple LX at 2.6 to 3.8 fl oz product/A for control of the weeds listed in ‘Weeds Controlled’ section. Use the higher rate for arid growing conditions or where weed infestations are severe. All rates are broadcast. Use proportionately less for band applications. Rainfall or sprinkler irrigation (0.5 to 1”) after application is required for

residual control. For more information refer to the Staple LX label and contact your DuPont representative.

### **Liberty 280 SL Herbicide on Liberty Link Cotton**

More varieties containing the LibertyLink trait only and GlyTol (glyphosate tolerant) and LibertyLink “stacked” cotton varieties are available this year. These varieties have excellent full-season tolerance (both crop size and rate) to the labeled herbicide, but applications must cease at 70 days prior to harvest to comply with the designated pre-harvest interval (PHI).

Although this herbicide system (LibertyLink varieties and Liberty herbicide application) works well against many problem weeds including morningglory, it should be noted that there are two critical issues surrounding this system. One issue is weed size. Typically, most weeds should be targeted at very small size (see label for 80 plus specific broadleaf species and about 30 grass species and size restrictions). An additional 25 plus species can be either controlled or suppressed with the 29 oz/acre rate or by two sequential applications (see label for specifics).

The other important issue is thorough spray coverage. Since this is a contact herbicide, it is critical that outstanding spray coverage be obtained. The label states that “uniform, thorough spray coverage is important to achieve consistent weed control. Select nozzles and pressure that deliver MEDIUM spray droplets as indicated in the nozzle manufacturer’s catalogs and in accordance with ASAE Standard S-572.” Bayer CropScience personnel suggest using flat fan nozzles, or Turbo-TeeJet types (if 60 psi pressure is used). It is NOT recommended to use air induction, raindrop nozzles, or flood-jet tips. A minimum total spray volume of 15 gallons/acre is required. For dense weed/crop canopies, a spray volume of 20 to 40 gallons/acre is required for thorough coverage. Also, ground speeds should not exceed 10 mph. Ammonium sulfate at 17 lb/100 gallons of spray mix is also recommended.

The label also states that “For cotton tolerant to Liberty 280 SL herbicide, Syngenta’s Dual Magnum or DuPont’s Staple herbicide may be tank-mixed with Liberty 280 SL herbicide and applied over-the-top post-emergence to enhance weed control and/or provide residual control.”

Liberty 280 SL has a federal label which allows higher rates for each application, as well as higher total in-season application rates for the glufosinate active ingredient. If producers opt to use a 29 ounce/acre first application, then two additional sequential applications may be made at the 29 ounce/acre rate (for a total of 87 ounces/acre per season). The Liberty 280 SL label will allow producers to apply up to 43 oz/acre in a single first application, however this reduces the seasonally allowed total to 72 oz/acre (or only ONE more sequential 29 ounce/acre application, with noted rotational restrictions. Always read and follow label directions.



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

Dual Magnum (Syngenta's brand of S-metolachlor) has a label for Touchdown or Roundup/Dual Magnum postemergence over-the-top tank (OT) mixes for use on Roundup Ready cotton. This product has a rotational restriction of 4.5 months for wheat, barley, oats, and rye. For alfalfa this time is 4 months. Refer to the label for specifics. Dual Magnum should be tank mixed with the supported labeled glyphosate material for residual control of pigweed, annual grasses and yellow nutsedge at 1 to 1.33 pt/acre. According to Syngenta personnel, OT tank mixes of Dual Magnum with glyphosate (Syngenta's Touchdown and Monsanto's Roundup brands) in Roundup Ready and Roundup Ready Flex cotton can be applied from emergence through 100 day preharvest interval (PHI). For Dual Magnum, a 100 PHI for postemergence OT or 80 day PHI for post-directed applications is required. Dual Magnum plus glyphosate may be post directed anytime up to the PHI. Also, it is suggested that ammonium sulfate, spray adjuvants, surfactants, fertilizer additives, or other pesticides NOT be included in the spray mix as phytotoxicity/crop injury may occur with the Dual Magnum formulation. The label states that "postemergence OT applications of this tank mixture may cause temporary injury in the form of necrotic spotting to exposed cotton leaves which will not affect normal plant development. Potential for reduced weed control from supported glyphosate materials could exist in extremely hard water areas due to the exclusion of ammonium sulfate. Best results are obtained when the Dual Magnum is incorporated 24 hours after application using 0.5 to 1 inch of irrigation water. There is a premix formulation of glyphosate and S-metolachlor (Dual Magnum) available called Sequence. For specific questions concerning any of these applications contact your local Syngenta representative.

## **Warrant Herbicide**

Warrant herbicide (acetochlor) is another option for residual control of small-seeded broadleaves and annual grasses (according to the label - pigweed species, carpetweed, purslane, prairie cupgrass, red sprangletop, witchgrass). It may be tank-mixed with glyphosate and applied postemergence over-the-top of Roundup Ready Flex cotton. Since Warrant only provides residual control (has no postemergence activity) the glyphosate is required to control weeds already emerged. Make sure that the glyphosate rate is appropriate for the weed species and size at application. This tank-mix should be made to 2-4 inch weeds and before the weed height and/or density becomes competitive with the crop. Although applications may be made once cotton has fully emerged until first bloom, the optimum application timing is when cotton is in the 2-3 leaf stage. It may be applied again when cotton is in the 5-6 leaf stage if directed to the soil. Rates range from 1.25 to 2.0 quarts per acre depending on soil type (consult label). Do not make postemergence surface applications using sprayable fluid fertilizer as the carrier because severe crop injury may occur. Some crop rotation restrictions also apply. Wheat can be planted 4 months after application, and the

following season, most other agronomic crops we produce can be planted. See the Warrant label for more information.

### **Prowl H2O Herbicide**

Prowl H2O herbicide may be applied as a broadcast over-the-top postemergence application in cotton for small-seeded broadleaf and annual grass control. Prowl H2O will not control weeds already emerged at the time of application, therefore the use of a postemergence herbicide treatment is required to control emerged weeds. Prowl H2O may be tank-mixed with Roundup PowerMax and applied over-the-top of Roundup Ready Flex cotton or tank-mixed with Liberty and applied over-the-top of Liberty Link cotton between the 4th and 8th leaf stages of growth. Adequate rainfall or overhead irrigation is required after application for herbicide activation. Wheat may be planted 4 months after an application of Prowl H2O, except under the following conditions: If less than 12 inches of rainfall or overhead irrigation was received between application and rotational crop planting, wheat should not be planted before 12 months after a spring application of Prowl H2O.

### **Roundup or Liberty/Insecticide Tank Mixes**

Some questions have been asked concerning the use of glyphosate or Liberty/insecticide tank mixes. Generally Orthene (acephate), dimethoate, and Bidrin have been the tank-mix partners mentioned for thrips control. No problems with cotton phytotoxicity or product efficacy have been noted.

### **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 exceeding 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. The majority of surveyed fields indicated that thrips are no longer an issue because of growth stage (5<sup>th</sup> true leaf). However, due to the lateness of some dryland fields due to moisture concerns at planting, those should continue to be scouted. Conversations with chemical distributors and consultants have indicated that no problems are occurring. 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, formerly Texas AgriLife Extension, Lubbock.



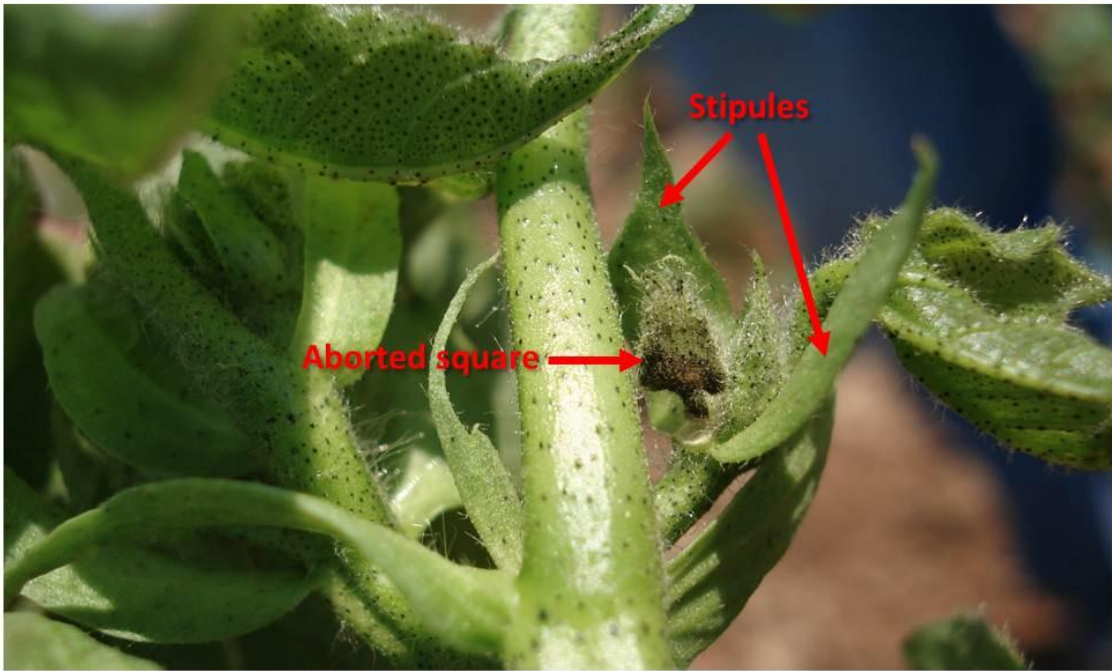


Photo courtesy of Shane Osborne

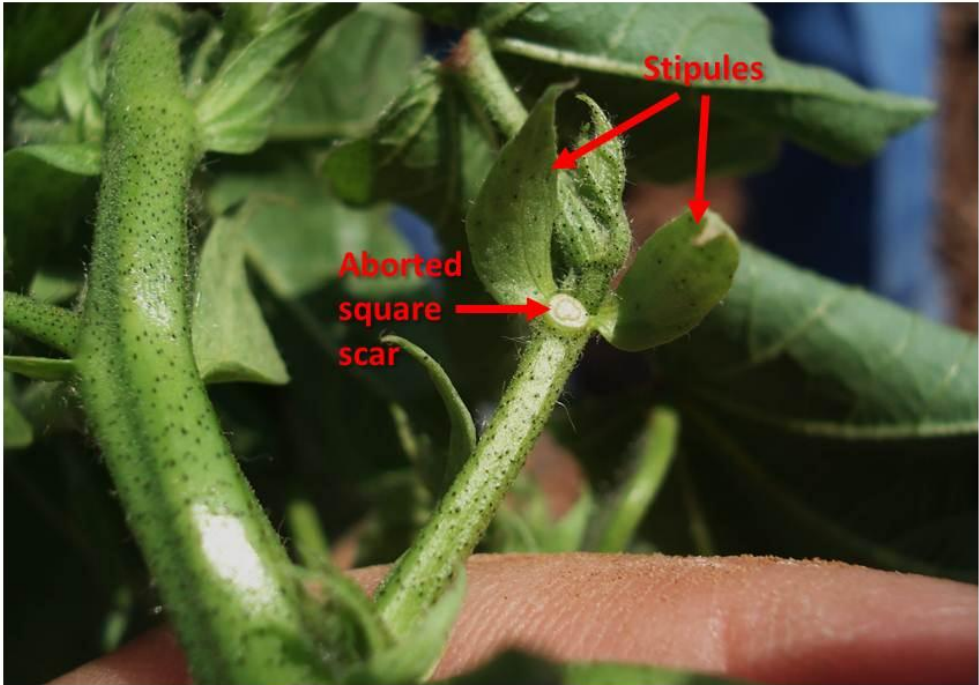


Photo courtesy of Shane Osborne



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 it 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 insects 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 supplemental label allowing its use in cotton from emergence to first bloom in Texas, Oklahoma and New Mexico, but you can't apply more than 3.2 oz/ac during this period. According to research conducted by Texas 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 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 AgriLife Extension at Lubbock has provided a threshold table.

Lygus Action Threshold

Cotton stage	Sampling method*	
	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 previous 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 beneficials. Vydate at 13-17 oz/acre has performed well in his trials.

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