FOCUS on South Plains Agriculture

Texas AgriLife Research and Extension Center at Lubbock
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Cotton Insects

Cotton Fleahoppers and Lygus

Cotton fleahoppers are still primarily relegated to the weeds but are beginning to move into cotton in greater numbers. Although populations in some areas remain too low to cause concern, there are hot spots of fleahoppers that need to be closely monitored for square set and the appearance of fleahopper nymphs. Nymphs tend to be the most damaging stage. Also, it appears that most of the cotton fleahoppers are moving into the taller, lusher cotton.

Lygus are numerous this year and appear to be moving into cotton in some areas, but for the most part the bulk of the population is still in the weeds. The fact that we are seeing Lygus moving into cotton this early in the season is very concerning. I have heard of a number of fields where square set has dropped to 70-80% and appears to be attributable to mixed populations of fleahoppers and Lygus. But where fields have gone through considerable environmental stress such as high winds and blowing sand, you can expect square retention to fall even in the absence of any insect activity. Be reasonable in your assessment of each field situation. It is easy to walk into a field and find an unacceptable square set and assume that insects are responsible, especially when a few fleahoppers or Lygus are found. You can generally tell when weather, not insects, is the culprit for these losses. Squares lost to weather tend to be missing from the bottom of the plant whereas fleahoppers tend to take the upper squares.

We have been working on a new guide, Managing Cotton Insects in Texas. Click here to view the chapter on cotton fleahopper.

Click here to view the chapter on Lygus.

Cotton fleahopper blasted square

Fields that currently have a high square set will likely not be able to hold all these fruit and will make adjustments. Some of these adjustments will be in response to cloudy weather, fertility and later water issues, and hot, dry conditions. Remember that only about 40-50% of all fruiting positions are retained. Also, most yield comes from 1st positions (80%) unless early losses dictate that 2nd positions (normally 15%) be used for compensation.

The decision to apply insecticide for fleahoppers should be based on the number of fleahoppers present, the squaring rate, and the percent square retention. During the first week of squaring, the economic threshold is 25 to 30 cotton fleahoppers per 100 terminals combined with less than 90% square set. In the second week of squaring, the economic threshold is 25 to 30 cotton fleahoppers per 100 terminals combined with less than 85% square set. Starting with the third week of squaring up to first bloom, the economic threshold is 25 to 30 cotton fleahoppers per 100 terminals combined with less than 75% square set. Although we had a late start planting, the high number of heat units we've been accumulating is pushing this crop fast. This being said, our more northern areas may not bloom until mid to late July and it may very well pay to be more aggressive on square set preservation where cotton is behind.

On pre-bloom cotton, the sweep net is the best tool for sampling Lygus, and a good action threshold when cotton is in the first two weeks of squaring is 8 per 100 sweeps. Once you get into the third week of squaring this threshold can be increased to 15 per 100 sweeps. However, watch the square set as well. It is not uncommon for adult Lygus to come into a field in high numbers but do little feeding before moving on.

When choosing an insecticide for cotton fleahoppers there are quite a few choices, including a number of pyrethroids. However, at this stage in the season you should avoid using a pyrethroid if possible. Cotton aphids are present in low numbers in some fields and using a pyrethroid can easily flare a low aphid population into one that will require additional insecticide applications. Viable alternatives to pyrethoids include: Bidrin, Orthene, Carbine, Centric, Intruder and Trimax Pro.

If treating for Lygus, similar to fleahoppers there are a number of alternatives from which to choose. However I would narrow this list to: pyrethroids, Orthene, Vydate and Carbine. I would avoid using a pyrethroid because of the aphid issue, although these products are highly efficacious towards our Lygus and provide good residual control. If you do not have aphids in your field and feel lucky, you can give them a shot. Orthene at 0.75-1.0 lb per acre will provide excellent control. If you have aphids or a few mites in your field, I would consider using Carbine. It is highly effective towards Lygus and aphids and easy on most beneficial insects. Lastly, Vydate is a good alternative and has performed well in my tests at 13-17 oz per acre. I have heard a report where 8.5 oz shots of Vydate were going out for nematode suppression and square sets in those fields were good, and untreated fields appeared to be suffering square loss from plant bugs.

Cotton Root Infesting Mealybugs

Greg Cronholm, IPM Agent (retired) in Hale and Swisher counties, came upon a field with stand issues and found mealybugs infesting the roots. Brant Baugh, IPM Agent in Lubbock County reported that he has found these before

and they appear to be associated most often with heavy soils near lake bottoms. We do not know what this mealybug is, or whether it contributed to the stand issue in Hale County. Specimens have been sent off for identification, and an insecticide efficacy test was initiated just in case. Root infesting mealybugs have been known to cause stand loss in soybeans and are a serious issue in a variety of ornamentals. If you want to check for mealybugs on cotton roots, gently dig up the plants using a trowel. Do not pull the plants up because the mealybugs will fall off in the soil. Also, dig as much of the roots up as possible, we have seen these bugs from just below the soil surface all the way to the root tip. At this time we are not recommending taking any action to eliminate this insect; we simply do not know how much if any damage they may inflict. DLK

Root feeding mealybugs found infesting cotton. *Click here for a full size image*.

Cotton Pests Around the State

Upper Coastal Bend (reported by Clyde Crumley, IPM Agent, Matagorda, Wharton, and Jackson counties)

The hot, dry weather pattern that has settled in over this part of the southeastern Texas is continuing with near record high temperatures being noted daily. Aphids and Lygus are present in fields but at low numbers. Treatable levels of stink bugs are continuing to be found in a number of fields in the area. We are beginning to find treatable numbers of *Creontiades* in the El Maton area of Matagorda County. Bollworm egg lays are variable across the area with some program fields in the La Salle, El Toro and Tintop areas having up to 24%. Damaged squares and bolls were between 0-14% and small worms (0-8%) as well as medium to large worms (0-6%) are being detected in program fields. This level of damage and bollworms is being found in conventional and WideStrike fields. Now while some of these levels are technically below threshold, some are not and it is worrisome when I see larger bollworms that are getting through and causing damage in the Bt fields. While the causative factor for what may be a "slip" has been speculated as being a dry weather related artifact, we seldom see 100% control with just about any product that is out there.

Middle Coastal Bend (reported by Stephen Biles, IPM Agent, Calhoun, Refugio, and Victoria counties)

Many cotton fields are nearing or past cutout; 5 nodes above white flower (NAWF). Fields range from 3-7 NAWF. We are not finding treatable levels of insects in the fields we are monitoring. Cotton bollworms moths are laying eggs but survival is very low in non-Bt fields. We continue to find worm damage in the plant terminals, but the worms are not found in many of the plants.

Southern Blacklands (reported by Marty Jungman, IPM Agent, Hill and McLennan counties)

Cotton growth stage ranges from two true leaves to quarter size bolls. Most of the cotton is just starting to bloom good with some small bolls. Cotton north of Hillsboro and the majority of the cotton in the western side of Hill and McLennan counties is in desperate need of rainfall. The rest of the cotton has adequate to good moisture. Cotton aphids are light but on the increase in some area fields. Cotton fleahoppers range from 4-70 per 100 terminals. Spider mites are being seen in higher numbers

in some area fields. Bollworm eggs range from 0-6 per 100 plants.

Northern Blacklands (reported by Glen Moore, IPM Agent, Ellis and Navarro counties)

High temperatures of near 100 degrees F and dry conditions prevailed across north central Texas during the past week. Cotton growth varies from late planted fields which have exerted the first true leaf to those in the bloom to small boll stage. The cotton fleahopper continues to be the most dominant insect pest. Fleahopper numbers have ranged from 6 to 34 adults and nymphs per 100 plant terminals in fields inspected this the past week. Sporadic outbreaks of spider mites are being observed in border rows of an increasing number of fields. Although aphid numbers remain light in most area fields, greater colonization of this insect has been observed in an increasingly number of fields over the past week. Grasshoppers continue to be observed feeding in turn rows of some cotton and grain fields.

El Paso Valley (reported by Dr. Salvador Vitanza, IPM Agent, El Paso County)

Cotton fields sampled are in 11-13 true leaf stage and cotton plants in fields with adequate moisture look great. I have detected low levels of the cotton fleahopper but it still has the potential to blast squares. In a few days, plants will be blooming and that will be the best indicator that this insect is transitioning from pest to beneficial insect status. I am surprised at the high population levels of lady beetles and green lacewings.

Cotton Agronomy

Overview of the week

Temperatures across the region have hot during much of the month of June. Click here to view June temperatures. From June 1-23, we have accumulated 501 heat units at Lubbock. This is 31% above the long-term average. Both high and low temperatures have generally been above normal for most of the 23-day period. From May 1 at Lubbock, we have obtained 814 heat units compared to the long-term average of 674. This is about 21% above normal, and this puts 2010 very close to 2008, but still well behind 2006 in terms of early season temperatures. Click here to view heat unit accumulation. The big difference is this year's improved soil moisture situation.

Some thunderstorms, mostly northwest of Lubbock have resulted in some scattered good rainfall events, however some fields have sustained some damage. Counties including Crosby, Bailey, Parmer, Lamb, and perhaps others have encountered limited stand losses. Substantial rainfall of 1-4 inches recently occurred in Deaf Smith County and provided excellent moisture relief with minimal storm damage. In some areas high winds and blowing sand associated with thunderstorm activity may be resulting in environmental damage to small squares and causing fruit abortion to a certain degree. However, with the square-thief insects in some locations, it will be important to scout fields in search of them. Mid-May planted cotton in Lubbock County has about 10 leaves and 3-4 squares at this time. The largest squares should bloom sometime in the first week of July. In contrast to some previous years' crops, much of 2010 crop should begin flowering relatively early. Dryland cotton in some areas, especially out west needs rainfall, but other areas are in excellent condition. A good regional rainfall event would help keep the dryland moving in the right direction and reduce pumping requirements for irrigated fields. According to Texas High Plains ET Network data for Lubbock, cotton planted on May 15 used about 0.22 inches per day on the average for the last 7 days. More recently, this number has increased to 0.30 inches per day.

Plant Monitoring

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). 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 85% square retention going into the first week of bloom. Many times, High Plains fields will enter blooming with square retention greater than that. 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.

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. For the High Plains region, greater than 8 NAWF could be considered excellent, 6-7 – reduced yield potential possible unless adequate irrigation is quickly initiated or rainfall obtained, 4-5 or less - cutout imminent on determinate varieties. Of course with so many varieties and many of the picker types being more indeterminate than many of our older stripper types, their ability to hang in there without cutting out is certainly worth consideration. This means that some of these varieties when given adequate moisture can "hover" or "suspend" at 5-6 NAWF over a two-three week time period. Water (rainfall, irrigation) is the key with these variety types. In many years, we can enter bloom in irrigated fields at 8 or so. In 2007, due to good early growing conditions and excellent rainfall distribution, many fields – even dryland fields entered first bloom with around 10 NAWF and thus the record crop production. 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. RKB

Cotton Diseases

Over the past few weeks, I received several phone calls regarding root-knot nematode damage on cotton. Symptoms of root-knot nematodes consist of a decline in cotton plants (Figure 1), such as reduced vigor, stunting and a reduced boll load. Under extreme conditions plants may completely die. Often, nematode symptoms resemble nutrient deficiencies due the damage that occurs to plant roots. Nematodes typically attack developing tap roots and secondary roots. The feeding conducted and damage caused by root-knot nematodes, results in the signature symptoms of the nematode root galls (Figure 2), which disrupts the plants ability to absorb water and nutrients.

Nematodes are small microscopic, round worms that live in the soil. They occupy the films of water that adhere to soil particles. In general, nematodes prefer sandier soil types, and populations are negatively correlated with clay content. The scientific name of the Southern root-knot nematode (*Meloidogyne incognita*) is reflective of the biology of the pathogen meaning "gourd-like female" (Figure 3). Nematodes hatch from eggs and pass through four juvenile stages, maintaining their worm shape (Figure 4), until they become adults. The second stage juveniles are the infective stage that locate and invade plant roots. Signals from the second stage juveniles elicit the production of specialized feeding sites (giant cells), which serve as a metabolic sink capable of supporting reproduction. After the development of these giant cells, mature females become sedentary, undergo a change in shape and are unable to exit the root. Root-knot nematode development is a function of temperature, and under optimal conditions the life cycle can be completed in ~30 days. This coupled with the fact that each female nematode can lay as many as 500 eggs

creates the potential for dramatic increases in nematode populations. The number of nematodes within the soil will dictate potential management options, as well as determine the severity of symptoms that may be observed. Nematode damage is often more severe when plants are experiencing other stresses, therefore, promoting vigorous growth is effective at minimizing looses. The primary management option for root-knot nematodes is the use of at-plant nematicides, such as Temik 15G (Bayer CropScience) applied at rates between 3.5 to 7 lb/A for low to high risk situations, respectively. The use of Temik will not completely eradicate nematodes in the soil; rather it suppresses nematode populations early in the growing season, allowing for root systems which can sustain nematode feeding to establish (Figure 5).

Performance of the seed applied nematicides such as Avicta Complete Cotton (Syngenta Crop protection), and Aeris Seed Applied System (Bayer CropScience) are more variable and are only recommended for fields with low risk. Vydate (DuPont™) is the only in-season foliar-applied product labeled for use in cotton, and is only recommended to supplement early season nematode treatments in high risk fields. Initial applications of Vydate (8.5-17 fl oz/A) should be made when cotton is at the second to fifth true leaf stage with a sequential application being made 7 to 14 days later. Results from field trials have indicated that pre-plant applications of the fumigant Telone II (Dow AgroSciences) reduce nematode damage and increase yields; however, minimal amounts of Telone II are currently being used in the region. Additional products are commercially available; however, efficacy data for these products are limited. The release of partially resistant and/or tolerant varieties (Figure 6) has provided additional management options for producers. Varieties with partial resistance disrupt nematode feeding and negatively impact reproduction. Our root-knot nematode variety trials are available online. Varieties with improved tolerance can maintain high yields in the presence despite nematode feeding.

In addition, to the direct damage nematode can cause, wounds created by nematode feeding can provide locations of entry for other pathogens, such as the fungal pathogen *Fusarium oxysporum* f. sp. *vasinfectum*, causal agent of Fusarium wilt. The Root-knot nematode-Fusarium wilt complex is becoming an increasingly important disease throughout southern cotton production areas of the South Plains. Symptoms associated with this disease-complex, in addition to those of the nematode include a general wilt which may be more prevalent during hot dry periods, chlorosis or necrosis of the margin of leaves (Figure 7), or death (Figure 8). Inspection of infected stems will reveal a discoloration of the vascular system (Figure 9). Symptoms can occur throughout the growing season. Damage that occurs in fields with a history of Fusarium wilt typically appears as large areas void of cotton (Figure 10). As the season progresses stunting and or defoliation may be observed on the outer edges of these area. Another symptom of Fusarium wilt is collar rot, which appears as dark, superficial lesions at the soil surface. It is important to correctly identify fields infested with *Fusarium oxysporum* f. sp. *vasinfectum* as management options are limited to the use of at plant nematicides and variety selection. Several commercially available varieties have performed well in field trials conducted over the past three years. However, some of these varieties are extremely susceptible to Verticillium wilt, thus isolation of the fungus in the laboratory (Figure 11) may be required. Results from Fusarium wilt variety trials can be accessed online. Additional information about the diagnosis of vascular wilts of cotton is also available online. If you have any questions regarding Fusarium wilt or any other cotton diseases please contact Jason Woodward at 806-632-0762, or via e-mail jewoodward@ag.tamu.edu. JEW

Non-cotton Agronomy

Last Recommended Planting Dates for Late Season Planting

AgriLife Extension publishes last recommended planting dates for common

crops used in hailout, replant, and late planting scenarios for the South Plains. These dates serve as a guideline to producers and provide a planting date by which producers can anticipate a high probability of making sufficient crop maturity with minimal risk from cool fall temperatures or an early frost or freeze. Recent experience, such as 2008 when a huge amount of grain sorghum was planted after July 1, demonstrate that planting date really matters, and each day a crop is planted earlier around the July 1 time frame can be worth 2 to 3 days of average heat unit accumulation in the fall. A table of last recommended planting dates is presented here.

Further starter information for replanting and late planting the above crops as well as summer annual forages, soybeans, and corn in the South Plains is found in "2010 Alternative Crop Options after Failed Cotton & Late-Season Crop Planting for the Texas South Plains," which is available from your county Extension office, the Lubbock Center, or online. CT

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