# FOCUS on South Plains Agriculture

Texas AgriLife Research and Extension Center at Lubbock
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## Cotton Insects

### Cotton Aphids

Cotton aphids continue to be the most common pest in cotton on the High Plains with hundreds of thousands of acres being treated thus far. However I do not think we have hit the zenith of this aphid outbreak. Over the next week temperatures are predicted to cool; this plays right into the aphid's hands (or tarsi if you are an entomologist). They prefer and reproduce quicker under cool conditions, while their enemies, particularly lady beetles, prefer things warmer.

Fortunately with the warm temperature we experienced last week we have seen a marked increase in lady beetles throughout the region. As a general rule, if you can find 0.3 lady beetle adults, or 0.2 lady beetle larvae per ft of row, then your aphid population will decline within a week. The lady beetles I am seeing most are the larvae of convergent lady beetle and the scymnus lady beetle. The larvae of the convergent lady beetle look like small black and orange alligators, while the larvae of the scymnus lady beetle look like small white fuzzy masses. See last week's FOCUS to see what lady beetle larvae look like.

You should treat for aphids when you reach or approach a threshold of 50 aphids per leaf and your population appears to be on the increase. Depending on the insecticide you are using, you may lower this threshold to compensate for insecticides that are not as efficacious as others. See last weeks FOCUS to view side-by-side insecticide efficacy information.

### Flaring aphids

If you currently have aphids but they are not numerous, perhaps because you have a

good population of lady beetles, you really want to avoid flaring them. This means avoid using harsh insecticides for controlling other pests. Pyrethroids are by far the most common insecticides and tend to be the most severe when it comes to flaring aphids. Most of this is because of there high toxicity to lady beetles, low toxicity to aphids and long residual which means it will continue to kill lady beetles for days. Seek alternatives where possible. This means choosing an insecticide that is not as toxic to lady beetles and/or has a shorter residual. If you have to use a pyrethroid, you may consider including an insecticide in with it that will kill what aphids are there.

**Insecticides for aphids**

The class of insecticides called the neonicotinoids is the most commonly used for controlling aphids in cotton. These include Centric, Intruder and Trimax Pro (or generic products containing imidacloprid). The use rates of these products depend on how many aphids you have, how rank your cotton is, and aerial vs. ground applications. High aphid populations, growthy cotton where coverage of these products is difficult, or if going out by air where coverage is most difficult calls for using higher rates. Intruder should be used at 0.75-1.0 oz/ac. My trials suggest that Centric should be used at 2.0-2.5 oz/ac, and Trimax Pro at 1.8 oz/ac. If you are using Trimax Pro or another imidcloprid product, I suggest you apply these before the aphid population exceeds 30 per leaf. This chemistry is much hotter on aphids if fed to the plant through the root. If you have drip irrigation, you may consider using Admire, which is the formulation of imidcloprid that can be applied through drip irrigation. When used through the drip, you should see excellent aphid control with little impact of beneficial insects. Make sure you give all of these products 3 days to express activity.

Alternatives to the neonicotinoids listed above include Bidrin and Carbine. These are each different classes of insecticides. I suggest using Bidrin at 8 fl oz/ac and Carbine at 1.5-2 oz/ac. The low rate of Carbine will usually suffice unless going out by air. Carbine is fairly soft on lady beetles and may take 5 day to kill. Bidrin is fast acting but toxic to lady beetles. However, it is short lived, so exposure to lady beetles during movement is greatly minimized.

Regardless of what you use, I suggest going by ground if possible and including crop oil concentrate at 1% v/v, or a good non-ionic surfactant. If you have to make a second application for aphids, avoid using the small class of chemistry previously used.

**Lygus**

Lygus have picked up considerably over the past week with active colonization occurring. This cotton crop is growing fast and getting tall and rank in many areas. This is prime habitat for Lygus. They like good cover and shade.

At this point in the season, the best technique for sampling Lygus is with a drop cloth. Preferentially, black drop cloths work better than white ones since small light colored insects such as Lygus nymphs show up better on the black drop cloths. Simply place the drop cloth between the rows and vigorously shake and beat about 1.5 row-ft for each side onto the drop cloth and then quickly inspect the cloth. Most adult Lygus will be stunned, but watch for those able to fly quickly. Two drop cloth samples constitute a single sample unit. Take at least four sample units or eight drop cloth samples per field side. If the total number of Lygus equals or exceeds 4 per 6 row-ft (2 per drop cloth sample); then an insecticide application is justified. Click here to view a draft of the Lygus chapter of the new cotton pest management guide.

Don't be in too big of a hurry to spray populations composed primarily of adults. Most of the situations I have seen where the population was primarily adults have not resulted significant damage. For the most part the adults appear to be coming in, laying eggs and leaving within 2-3 days; they do not appear to be doing much feeding. However, if you have growthy cotton that is shading the middles, they may want to stay and, in that scenario, an insecticide application may be justified if at threshold. Once you begin to pick up predomi-

nately nymphs, be careful. It is at this point where high levels of damage can occur.

*From top to bottom, a 1st instar, 4th instar and adult Lygus.*

For the most part, Lygus on the Texas High Plains are fairly easy to control with the right insecticide, unlike other parts of the U.S cotton belt where insecticide resistance is an issue. Last year we conducted several Lygus management tests looking at Carbine, Ammo, Orthene, Vydate, Centric and Diamond. All of these products have some Lygus activity, although based on our data, Centric appears to be a little weak. Syngenta, the company that produces Centric, does not recommend Centric for Lygus control on the Texas High Plains. If you use a pyrethroid such as Ammo, Orthene or Vydate, you can expect an immediate kill, while Carbine and Diamond act more slowly. Carbine is an anti-feedent, so the insect will essentially have to starve to death - which may take up to 5 days depending on temperature. Diamond is an insect growth regulator and will only express activity on Lygus nymphs; it will not kill the adults. Thus, if you have a Lygus population composed primarily of adults, Diamond is probably not your best choice. Similar to Carbine, Diamond may take 3-5 days to kill the Lygus; death from this product occurs during the molting process. Click here to view all of the 2008 Lygus Test Results.

One thing to be wary of when selecting a product for Lygus control is it impact on beneficial insects and the likelihood of flaring a secondary pests such as aphids. Of the products we looked at in 2008, Carbine and Diamond are least likely to cause secondary pest outbreaks. Both of these products are fairly easy on beneficials, especially Carbine. Also, Carbine has good aphid activity while Diamond has good activity on armyworms. Orthene and Vydate will be less likely to flare aphids than a pyrethroid.

**Bollworms and cotton square borers**

Worms have been rearing their heads primarily in non-Bt cotton in the southwest and western areas of the South Plains, but in some fields around Lubbock westerly as well. We have been seeing high mortality of the small bollworms that were laid in the plant terminals, but the survivors or those worms laid in the canopy are causing chronic prob-

lems. These populations are initially not high enough to cause real concern, but with new egg lays coming every 5-7 days, we end up with a population "nickel and diming" us, and once they get a little size to them and move deeper in the canopy they are extremely difficult to control.

On top of bollworms we are seeing more cotton square borers than I have ever seen before. Some fields have been treated exclusively for this pest. Cotton square borer looks like light green grub and will most often be found boring into squares, but when larger can be found in blooms and boring into small bolls under the bloom tag. The adults, called gray hairstreaks, are a light gray butterfly. Larvae of the square borer have a longer development time than bollworms and may require as long as 18-20 days to complete development, whereas a bollworm will take 14-16 days.

*Larva of a cotton square borer feeding on a square (photo courtesy of North Carolina State University)*

Include cotton square borer count in with your bollworm counts and treat as you would for bollworms. Good coverage is essential to achieve the best control. Once these worms move deep in the canopy, it's hard to get the insecticide to them and control may be difficult. Consider treating for these worms when you reach 10,000 per acre for small worms (≤ 0.25 inch) or 5,000 per acre if larger. But use this threshold as a guide not a hard rule. If you are getting constant egg lays and "nickel and dimed", or if your square set is lower than desired, you may want to be more aggressive. By and large, pyrethroids are the products of choice for bollworm control. We do not have data on square borers, but experience suggests that pyrethroids are the best option for them as well. If you think you may have coverage problems, consider using a high pyrethroid rate. WATCH FOR APHIDS AFTERWORDS! Click here to view a draft of the bollworm chapter of the new cotton pest management guide.

*Cotton square borer adult (P. Porter)*

**Stink bugs**

I'm hearing report of stink bug problem to the south, out in the Wellington area, and low numbers throughout the High Plains. We are seeing all varieties of stink bugs: green, brown, harlequin and conchuela. Sample stinkbugs like you would for Lygus with a drop cloth and treat if you reach or exceed 1 per 6 row-ft. You should be able to get good control with a pyrethroid, 0.75-1.0 lbs of Orthene/Acephate, 8 oz of Bidrin, or Leverage or Endigo. If you have

aphids, stay away from the pyrethroids and remember that both Leverage and Endigo have pyrethroid in them but do have something to keep the aphids under control initially. Both of these are extremely efficacious on stink bugs but there is a chance that the pyrethoid in them will lead to an aphid flare. Click here to view a draft of the stink bug chapter of the new cotton pest management guide.

**Spider mites**

We are hearing reports of mites in central Texas and southwestern Oklahoma. We need to watch closely for mites coming in behind aphids that were sprayed with Intruder, Centric or Trimax Pro. We may never see them, but we need to be vigilant. DLK

## Cotton Diseases

**Verticillium wilt update**

July is a time for swimming pools, baseball, fireworks and barbeques. Unfortunately, as a result of the cool wet conditions we experienced early in the month were also experiencing the onset of Verticillium wilt, caused by the soilborne fungus *Verticillium dahliae*. Several growers and consultants I have spoken with over the last week indicate that the disease is showing up early this year. Likewise, the level of disease incidence appears to be higher than what might have been observed in years past. Leaves of infected plants will appear wilted and exhibit a yellowing between the veins before becoming necrotic. Further examination of stems and branches will reveal a discoloration of the vascular system. Infected plants will also appear stunted and in some cases may defoliate prematurely and death may occur. The fungus survives in the soil as specialized structures (microsclerotia), which germinate in response to root growth.

Disease severity is positively correlated to populations of the fungus and the number of root infections. Research and Extension personnel with Texas *Agri*LIFE are currently investigating the influence of cultural practices such as seeding rates, irrigation, crop rotation, and fertilization rates on disease development. This information will be used in conjunction with current variety recommendations to develop an integrated system to maximize production in fields with a history of Verticillium wilt. Great efforts have been made over the last several years in characterizing the reaction of commercially available cotton varieties to Verticillium wilt and varieties with partial resistance have been identified. However, with the conditions we have experienced keep in mind that in a year like this "nothing is going to be resistant", therefore don't be surprised if wilt symptoms are more prominent in varieties that have performed extremely well in the past. As things continue to dry out and we look to resume irrigation avoid overwatering when possible as this may exacerbate symptoms expression. I have also heard reports that fungicides and foliar feeds are being applied for Verticillium wilt control and or suppression. While certain cotton diseases are believed to occur under nutrient deficient situations (i.e. Alternaria leaf spot may be more severe in potassium limited situations), Verticillium wilt is not one of them. Furthermore, **THERE ARE NO FUNGICIDES LABELED FOR VERTICILLIUM WILT CONTROL IN COTTON**. While several products can be used in the management of foliar diseases, these products do not appear to have activity on *V. dahliae* and thus should not be used. As always, refer to the pesticide label prior use. Additional information on the diagnosis and management of Verticillium wilt is available. If you have any questions regarding Verticillium wilt, or any other cotton diseases, feel free to contact Jason Woodward at 806-632-0762, or jewoodward@ag.tamu.edu. JW

*Photos appear on the following pages.*

*Characteristic foliar symptoms of Verticillium wilt*

*Severe stunting of plants infected with Vericillium wilt*

*Close-up of a leaf exhibiting symptoms of Verticillium wilt (intervenial chlorosis and necrosis)*

*Discoloration of the vascular system of a plant infected with Verticillium dahliae*

*Premature defoliation of plants infected with Vericillium wilt. Note the leaves that have been shed from the lower canopy.*

## Corn and Sorghum Insects

### Corn Insects

**Spider mites** have rebounded after the rain delay. While their reproductive rate on pre-tassel corn is not too wimpy in itself, their reproductive rate on post-tassel corn is 4x greater, truly impressive. The generation time for Banks grass mite on corn is 5.5 days at 97 degrees. Females lay approximately 900 eggs over 30 days, but remember that their offspring begin laying eggs 5.5 days after they are laid. Basically, by the time the original female mite lays her 900th egg, her great, great, great, great, great granddaughter is laying eggs. Corn is not safe from spider mites until it reaches full dent stage. Scouting procedures and thresholds can be found in Managing Insect and Mite Pests of Texas Corn. Oberon is the only dedicated miticide suggested for post-tassel use. Bifenthrin + dimethoate or Hero might be a consideration in areas where mites don't have tolerance to bifenthrin. Good coverage is essential, so don't skimp on the gallons per acre. Bt corn is as susceptible to spider mites as is non-Bt corn.

Non-Bt corn is also threatened by **fall armyworm** and **southwestern corn borer**. The second generation southwestern corn borer flight is underway and will probably peak in the next few days. My traps near non-Bt corn in Hale County jumped from 31 last week to 98 early this week. It is time to scout non-Bt corn for fall armyworm and southwestern corn borer. If an insecticide for caterpillars is necessary, remember that pyrethroids can flare spider mites. Pyrethroids work well on southwestern corn borer. Fall armyworm is less susceptible to pyrethroids. Both of these pests must be detected and treated early - before they enter the stalk (SWCB) or ear or ear shank (FAW). Scouting techniques and control options are presented in Managing Insect and Mite Pests of Texas Corn.

### Sorghum Insects

There are still plenty of **fall armyworm** larvae in whorl stage sorghum, not at treatable levels, but they are there. Once they become adult moths, these insects will fly and lay eggs on sorghum panicles, and the resulting larvae will be "headworms". Corn earworm is the other species that joins fall armyworm to become the "headworm complex". Sampling for headworms should begin just after flowering and continue until the hard dough stage. Our improved thresholds (2007) lowered the number of larvae per acre necessary to cause economic damage. The threshold varies according to the size of the larvae, grain value and control cost and is reprinted here. The first table is for large larvae (> ½ inch) and the second table is for larvae ¼ to ½ inch. To give you a ballpark idea of things, one large larva per three plants can justify treatment, but check the table for your specific situation. The threshold for medium sized larvae is much higher because most of these will die before becoming large.

We are on guard for **sorghum midge**, and blooming fields should be scouted frequently. Johnsongrass is the early season host for sorghum midge, and it shifts to sorghum when bloom starts. With a generation time of 14 – 16 days we frequently see rapid increases in midge populations. Each midge female can lay approximately 50 eggs in one day, and each egg can prevent a kernel from developing. Begin sampling in the mid-morning when temperatures reach approximately 85 degrees. Each midge lives less than a day, so scouting should be done almost every day while the plants are flowering.

Managing Insect and Mite Pests of Texas Sorghum has all of the scouting information, thresholds and control options for headworms and sorghum midge. RPP

## Sorghum Agronomy

### Pigweed and Other Mid-Season Weed Control Issues in Grain Sorghum

With the ample rains in early July, once again some of our late-planted sorghum crop is hanging on against pigweed. Key to many herbicide options in grain sorghum after emergence is the stage of growth of sorghum when you wish to use the herbicide. Many herbicide labels note that applications can be made up to a certain height or leaf number (e.g. apply dicamba herbicides such as Clarity, Banvel, etc. prior to 15" tall, but use drop nozzles if sorghum is taller than 8"). Other herbicides will discuss application restrictions in terms of leaf number. Either restriction, height or leaf number, corresponds in part to the development of the growing point which switches over from producing leaves to initiating development of the spikelets and potential number of seed you may have for each head. The effort to guide herbicide applications such as dicamba and 2,4-D (if it is even allowed in your county) is to minimize any of these growth regulator type herbicides from getting in the whorl which could lead to 'blanking' or 'blasting' of the head hence no seed development.

Common problems over the past several years with these types of sorghum herbicide applications have been twofold: 1) spraying and getting too much herbicide on the sorghum plant and ultimately in the whorl (sorghum often looks damaged for up to 10-14 days, but generally will grow out of it); and 2) using hoods or directed spray (drop nozzles) that are not working the way they should and hence again putting too much herbicide on the plants. Consult your herbicide labels for additional details on your application.

Here is a summary of key post-emerge herbicide considerations for grain sorghum for 2010 drawn from Dr. Brent Bean's "Quick Guide for Weed Control in Texas High Plains Grain Sorghum (2009)". Many other herbicides labeled for grain sorghum are listed in this document.

Atrazine

- Apply when sorghum crop is 6 to 12 inches in height.
- Apply before pigweed exceeds 6 inches tall.
- Add crop oil concentrate (COC) @ 1 qt/ac.
- Can use drop nozzles after crop is 12 inches tall.
- Weak on grass control.

Dicamba (Banvel, Clarity, etc.)

- Apply to sorghum from spike to prior to 15 inches in height.
- Use drop nozzles if sorghum if taller than 8 inches.
- Do not apply dicamba to sorghum grown for seed production.
- Apply to actively growing weeds less than 3 inches tall.
- Application may result in leaf rolling or leaning sorghum plants.
- Plants usually grow out in 10-14 days.

2,4-D (amine 4, LV6, etc.)
**Special note**: 2,4-D use is not permitted in most counties of the Texas High Plains where cotton is present due to the extreme sensitivity of cotton to the chemical.

- Apply to sorghum from 6 to 15 inches in height.
- If sorghum is taller than 8 inches in height, use drop nozzles and keep spray off foliage.
- Do not treat during the boot, flowering, or dough stage as head blasting may occur.
- Apply to small, actively growing broadleaf weeds.

Texas AgriLife staff with specific expertise for weed control in grain sorghum include Dr. Wayne Keeling, Lubbock, (806) 746-6101, wkeeling@ag.tamu.edu, and Dr. Brent Bean, Amarillo, (806) 677-5600, bbean@ag.tamu.edu**. CT**

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