FOCUS on South Plains Agriculture

A newsletter from the Texas AgriLife Research and Extension Center at Lubbock

Volume 50 number 10 13 July 2011

http://lubbock.tamu.edu/focus

Editors' Note

ANNOUNCING A SMART PHONE AND TABLET VERSION

2011 is the 50th year of FOCUS and we are celebrating, in part, by introducing a version that can be read on smart phones and tablets. In order to accommodate these small devices we need to break with our traditional two column format. This step was not taken lightly and we hope our readers will let us know whether or not the new format is an improvement. We will continue to post a PDF file on the FOCUS website. The ePub version for smart phones and tablets will be attached to the e-mail our subscribers receive when they get the announcement for each new edition of FOCUS. Patrick Porter and David Kerns, Editors.

ePub is an open e-book standard produced by the International Digital Publishing Forum. Reading software for this standard is available directly from the hardware manufacturer or operating system creator for most types of smart phones and tablets. To open the ePub version of FOCUS simply click on the attachment and direct your phone or tablet to use your ePub reading software to open it. A list of ePub readers is available on Wikipedia at http://en.wikipedia.org/wiki/EPUB. Examples of available free readers are iBooks (for Apple iPhone and iPad) and FBReaderJ for Android.

Some of these readers can also open ePub documents from within a web browser. For example, EPUBReader is free and lets an ePub be read from within the Firefox web browser.

Cotton Insects

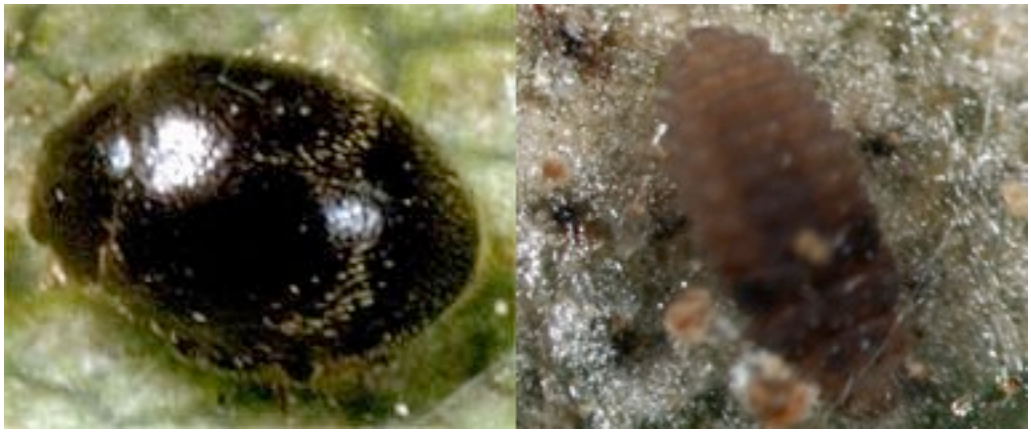
COTTON FLEAHOPPERS

Cotton fleahoppers are few and far between and I have not observed a single field where there are enough to warrant any concern. In fact I have only seen a couple over the past week. Avoid making automatic insecticide applications where square set has dropped unless fleahoppers or other plant bugs are present and worthy of treatment. Most square loss I have seen is due to heat, wind and the inability to maintain good moisture.

Spider Mites

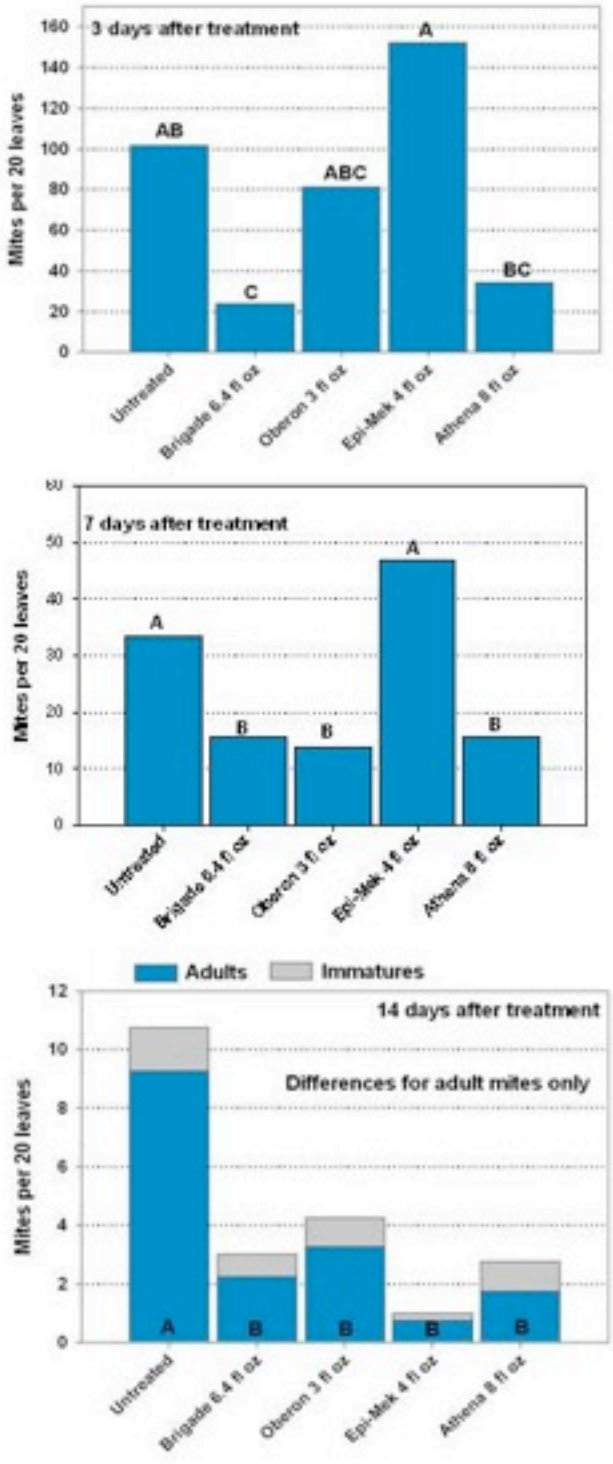
Spider mites continue to plague the region and seem to be spreading. Determining when to treat can be tricky. You do not want to treat too early since mite populations will often crash on their own, but you do not want to let them get so thick that webbing interferes with the miticide spray coverage. We have observed where some miticides may not perform well where there is a lot of webbing and accumulated dirt on the leaves. Essentially, if you are seeing a lot of speckling and yellowing on the leaves, and you can see a lot of "red dots" walking around on the underside of the leaves, chances are you should probably treat.

We are finding predaceous thrips and lady beetles feeding on the mite colonies, but I have not seen enough of these to keep a mite population under control. The thrips we are seeing are the six spotted thrips and the lady beetle is the spider mite destroyer. These lady beetles are not your ordinary orange with black dots lady beetles but are black and very small, slightly larger than big mite. The larvae of the spider mite destroyer are small, gray, and grub like.



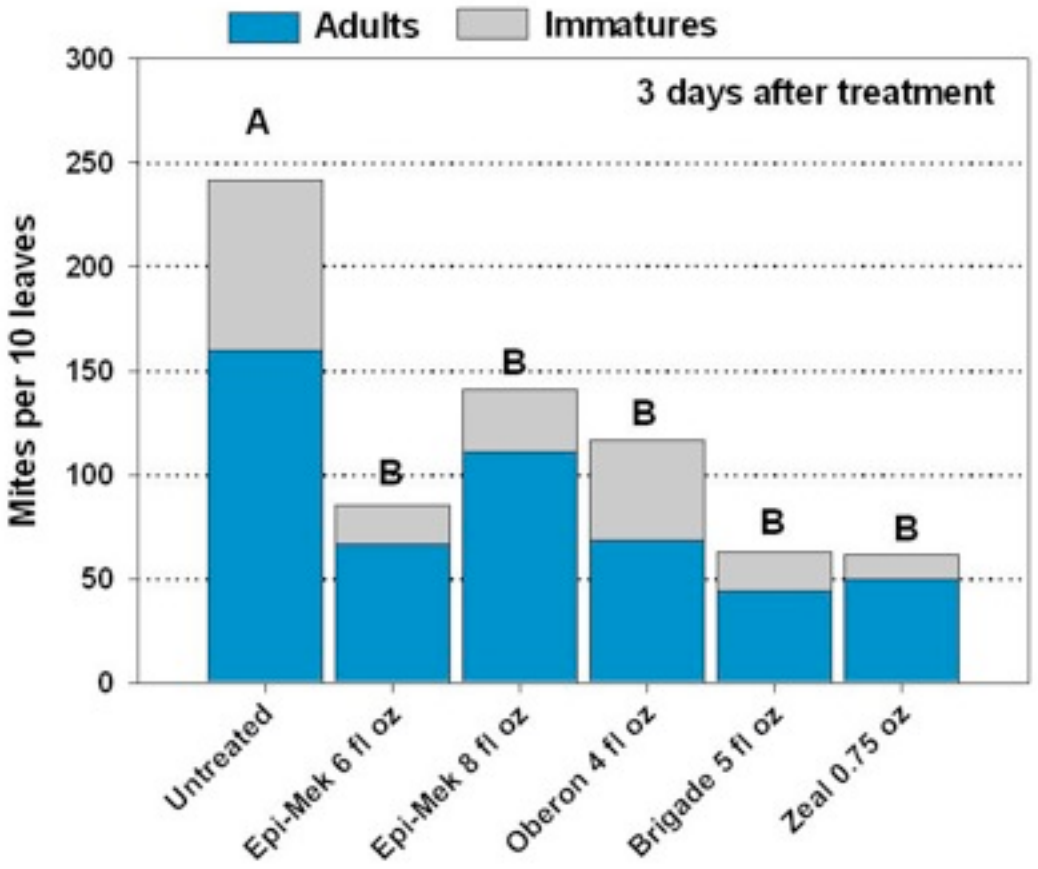
Spider mite destroyer adult (left) and larva

So what's working on mites? In our first test the Epi-Mek at 4 fl oz/ac did not perform as well as we would have like; although numbers were lower than the check at 14 days after treatment the mite population had crashed so it's hard to say how well it actually worked. Brigade at 6.4 fl oz, Oberon at 3 fl oz and Athena at 8 fl oz all looked good versus a moderate mite infestation. In commercial fields, Epi-Mek at 8 fl oz, Brigade and Sniper (both bifenthrin) at 6.4 fl oz and Bidrin XP at 1 duo-container to 25 acres all provided good control.



These are the data from our first mite test

In our second test the mites were more plentiful and we used a higher rate of Epi-Mek and Oberon, but a lower rate of Brigade. We also included a low rate of Zeal. So far we only have a 3 day evaluation, but at that time all of the products had fewer (although unacceptable) numbers of mites than the untreated and did not differ from each other.



These are the 3 days after treatment data from our second mite test

Thus data suggest that the following treatments look good. Bifenthrin (Brigade, Sniper and other generics) at 5-6.4 fl oz/ac, Oberon at 3-6 fl oz, Epi-Mek (also Abba, Agri-Mek, Zoro and other generics) at 6-8 fl oz (8 fl oz looked good on a commercial field), or Zeal at 0.75-1 oz. Use higher rates when the mite population is very high or dust and webbing is on the leaves. Cost will vary but Bifenthrin is running around $146/gal, Epi-Mek about $106/gal, and Oberon about $507/gal. I'm not sure on the cost of Zeal.

Use high spray volumes if possible. Al least 15 gal/ac by ground or 5 gal/ac by air and I suggest including a non-ionic surfactant.Use the Heading style to break each chapter up into unique subsections. In the Table of Contents, headings are indented underneath chapter names

with a distinctive look. They make is easy for readers to find and jump to specific content in your publication. DLK

Cotton Agronomy

Crop Condition

At the time of this writing (July 12), we had received approximately 0.4" of rainfall overnight at the Texas AgriLife Research and Extension Center north of Lubbock. Unfortunately all this accomplished was proving to us that it can still rain in the High Plains! Temperatures have moderated somewhat but continue to be at or near 100^0F across the region. One bright spot is that the winds seem to have subsided for now. Most of the cotton that is still alive is struggling at best, with irrigation continuing at full capacity in most locations. Cotton conditions range from extremely poor to fair and some fields are beginning to bloom or have been blooming for a week now. The best that I have witnessed is coming into bloom at 7 nodes above white flower (NAWF). This is an indication of stress and most likely reduced yields. I have heard that some more severely drought stressed fields are coming into bloom at cutout. These type situations will most likely result in significantly reduced yields. With peak bloom just around the corner, cotton water demand will increase and producers with low capacity irrigation systems will surely find it difficult at best to maintain acceptable crop progress through this period of development (see June 30 issue of Focus article by Dr. Dana Porter for more information on irrigation and water use/demand and system efficiency) . Producers may be tempted to abandon partial pivots in order to maintain the remainder of the field. It would be in their best interest to check with their insurance agent to determine the feasibility of this practice prior to initiation.

Abnormal Square Development

Recently I have been made aware of, and have witnessed firsthand, some four bract squares that developed during the extremely high temperatures earlier in the season (late June). This phenomenon has been witnessed not only in the Texas High Plains, but in Southwest Oklahoma as well. There are three variations of this abnormal bract development. One variation occurs when a fully developed fourth bract is produced (Figure 1). Most likely, this version will result in normal boll development. The second variation occurs when a fourth bract is fused to the floral bud (Figure 2). The third variation is when the floral bud appears to have an extra growth (Figure 3). The second and third variations may result in square abortion. More information on this phenomenon is available in Cotton Physiology Today, Vol. 4, Num. 1. This appears to be associated with square development under extreme high temperatures and occurs across varieties (not variety specific).

Figure 1. Fully developed fourth bract. Figure 2. Fourth bract fused to floral bud. Figure 3. Abnormal growth on floral bud. All photos courtesy of Dr. Sandy Stewart.

Plant Growth Regulators

I have received some calls recently concerning plant growth regulator (PGR) applications. Under the current growth conditions I feel that it would be difficult to justify a PGR application. With that being said, the situation could change if we begin to receive significant rainfall on some fields under high capacity irrigation systems that have some soil profile moisture and adequate fertilization. The following is a reprint from the July 14, 2008 Focus article by Dr. Randy Boman.

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 by increasing growth rate. 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; or fertility stress. Results from our replicated testing indicates that we got from 5 to 15% reduction in plant height (compared to the control) 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. We have been able to "shave" about 1 node from the growth of the main stem at some locations, 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. Our results have shown that we usually do not get statistically significant increases in yields, but do get excellent growth control. Many times we don't see a lot of differences in performance of many of these products when comes to growth control. Pix and other mepiquat chloride (MC) based products have been around for many years. Several plant growth regulators (PGRs) based on the same active ingredient are now available in the Texas High Plains. Pentia is a formulation of mepiquat pentaborate - a different molecular structure than MC. Its physiological effect is

reportedly "hotter" oz-for-oz than MC, however, the suggested use rates are equivalent to MC. Also, the Mepex Gin Out product contains the same amount of MC active ingredient as Pix and others, but contains an additional PGR.

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

Pentia: Mepiquat pentaborate molecule (different from MC): 9.6% a.i./gallon or 0.82 lb/ gallon a.i. It has been reported that the physiological effect of Pentia is "hotter" oz-for-oz than MC, however, BASF's suggested use rates are essentially equivalent to Pix.

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.

Stance: Bayer CropScience's Stance product is a mepiquat chloride based PGR. It is a 4 to 1 ratio of mepiquat chloride and cyclanilide (0.736 lbs/ gallon mepiquat chloride 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. If you have specific questions concerning this product, visit with your local Bayer CropScience representative.

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 earlyseason 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 picker varieties (many of which are more indeterminate than most of our stripper types) and have conditions resulting in high growth potential need to be concerned. Growth potential of some of these varieties is considerably greater than many of our stripper types. 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 picker varieties under high input irrigation (drip or high capacity pivots). If plants get larger than 36 inches, harvest efficiency and productivity drop significantly. With the greater number of spindle picker harvesters working in the region, 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.

Determination of application rates is generally more "art" than "science" for these products. Applications must begin no earlier than 50% matchhead square. 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 the High Plains dilemma: It is unknown at that time as to how weather will affect the crop for the remainder of 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 picker varieties and fruit retention. If a high growth potential picker 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 picker 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. Use MC to limit plant size. Sequential applications can be adjusted to meet subsequent crop conditions and growth potential. MK

Cotton Disease Update

Fusarium

In general, the hot dry conditions we are experiencing on the southern High Plains are not conducive to disease development. I have seen numerous cases of root-knot nematodes, as well as initial symptoms of Fusarium wilt and have heard reports of Verticillium wilt. Also of interest was a severe case of charcoal rot that was observed on a recent trip to western Gaines County. Symptoms occurring on above ground plant parts resulting from root-knot nematodes (Meloidogyne incognita) include stunting, reduced vigor, and chlorosis. Infected plants may express symptoms which resemble nutrient deficiency symptoms as compromised root systems are unable to take up nutrients required for proper plant growth. Nematodes feed on both tap and feeder roots. Such damage results in the stunting of roots and abnormal growth. When root-knot females initiate feeding sites, they alter normal functions within the plant (via the formation of specialized cells to redirect nutrients) that allow for nematode reproduction. As the nematode produces eggs she takes on a swollen shape. The formation of these specialized 'giant' cells and the swollen nematode results in the formation of the spherical galls that are found on roots of plants infected with M. incognita.

Fusarium wilt is caused by the soilborne fungus Fusarium oxysporum f. sp. vasinfectum. Symptoms associated with this disease consist of a general wilt, as well as chlorosis or necrosis on the margins of leaves in the lower canopy. Wilt symptoms are more severe on hot, dry days when the plants demand for water is high. Such symptoms occur because of clogging of the vascular system caused by infection. Mortality can occur in young plants. Discoloration, which is continuous, can be seen when examining the inside of the root system or lower stem. In contrast, the vascular discoloration caused by Verticillium dahliae, causal agent of Verticillium wilt, has a more non-continuous or speckled appearance. Foliar symptoms of Verticillium wilt are similar to Fusarium wilt with subtle differences. Symptoms of Verticillium wilt first occur during early bloom. Leaves wilt and exhibit a yellowing between the veins. As the disease progresses infected plants will defoliate prematurely and may die under severe infections.

CHARCOAL ROT

Charcoal rot, caused by Macrophomina phaesolina, can occasionally be isolated from cotton pants any given year, but typically does not cause any yield loss. While hot, dry conditions are generally unfavorable for most diseases, such conditions exacerbate charcoal rot. Plants infected with M. phaesolina may exhibit severe wilting and death. Roots of infected plants have a black or grayish color. Discoloration may also be observed in the lower stem.

Blackened roots and wilting, symptoms of charcoal rot

Diseased plants may occur in irregular patches; however, field observations indicated that a large proportion of plants (~80%) can be infected without exhibiting symptoms. These symptoms may be confused with Fusarium wilt; therefore, proper diagnosis is required to determine the cause. During later stages of charcoal rot, the fungus produces small black structures (microsclerotia) that may be present within diseased tissues. If you have any questions regarding these or any other cotton diseases contact Jason Woodward at 806-632-0762 or jewoodward@ag.tamu.edu. JW

Corn Aflatoxin

Potential for aflatoxin contamination in corn on the High plains

By Jason E. Woodward and Lindsey D. Thiessen, Graduate Research Assistant, Department of Plant and Soil Science, Texas Tech University

Aflatoxin issues are capable of occurring in several row crops including corn, cottonseed and peanut. Aflatoxin is a toxic and carcinogenic compound produced by two mold fungi, Aspergillus flavus and A. parasiticus with A. flavus being the most predominant causal agent. The fungus can be recognized by a yellow-green or gray-green mold on affected kernels in the field or in storage. In general, Southern regions of the United States have aflatoxin contamination with greater frequency than other parts of the country due to drought conditions and higher temperatures. Historically, aflatoxin issues in west Texas are sporadic; however, loads testing above the 20 parts per billion (the current threshold for white or food corn) can be rejected at the elevator. Corn used for animal feed that is contaminated with aflatoxin (200-300 ppb) may have limited local uses; however, it not allowed for sale or interstate commerce.

Aspergillus flavus can infect stored grain, or the fungus may infect corn in the field. Infections by A. flavus often occur when the weather is hot, above 86°F, and dry during the silking stage. Contamination by aflatoxin may happen at any given time, but occurs more commonly when plants are stressed, either by drought or high temperatures, nitrogen deficiency or significant insect damage. Although A. flavus produces aflatoxin, the incidence of the fungus does not always coincide with high levels of aflatoxin.

Testing for Aflatoxin in Corn

Because aflatoxin is not always produced in the presence of A. flavus, it is important to determine the presence and level of aflatoxin produced in a crop. There are two main screening methods for aflatoxin in corn. The first method is visual screening using a black light. Under black light illumination, A. flavus infected kernels fluoresce bright green-yellow. The black light test is often unreliable and does not quantify the aflatoxin in the sample. The second method is a laboratory immunoassay. In the quick test, a quantitative kit is available to test the range of toxin levels. If aflatoxin is found in the test sample from the previous two tests, quantification is necessary.

Management of Aflatoxin in Corn

Although it is impossible to remove A. flavus from corn fields, it is possible to reduce the incidence of aflatoxin contamination. Managing insect damage will reduce the incidence of infection. Early detection of fungal infection through scouting will help determine whether the crop has extensive infection. Minimizing kernel damage at harvest will reduce infection and contamination in storage. Cleaning all bins and storage facilities will reduce contamination from

corn residue. Check stored grain every couple weeks for moisture and temperature. To prevent infection, anti-fungal agents may be used but are not curative.

Use of Atoxigenic A. flavus strains

Recently, products such as AF-36 or Afla-Guard® have been commercialized and shown to reduce aflatoxin in other corn producing regions. Both of these products are commercial preparations of A. flavus strains that do not produce aflatoxin, thus they are referred to as atoxigenic strains. Information regarding the performance of the AF-36 or Afla-Guard® on the High Plains is limited due to the sporadic occurrence of aflatoxin in the region. Prior to using such products one must consider the potential for or history of aflatoxin problems within a field, the environmental conditions, as well as the growth stage of the crop. Fields that have a confirmed history of severe aflatoxin are more likely to show a reduction in aflatoxin when treated with the atoxigenic strains compared to fields with little or no history. Drought conditions and or high temperatures favor A. flavus infections; however, relative humidity plays a factor is activating formulations of the atoxigenic strains, which are typically colonized grain seed. Dew and moisture will allow for the atoxigenic strains to produce spores over several days (longer if conducive conditions persist). In addition, application timing greatly affects efficacy atoxigenic strains. These stains work by excluding or outcompeting toxigenic A. flavus strains upon infection. A. flavus infections typically occur at the silking stage; therefore the atoxigenic strains should be applied beforehand so that adequate sporulation can occur. Application timings for AF-36 and Afla-Guard® are V7 to silking and V10-V12 to silking, respectively. Late applications made after silking may not work. Food or white corn fields that were later planted and are experiencing drought stress may benefit from applications of atoxigenic strains. A more in-depth Factsheet on titled "Prevention of Aflatoxin Contamination of Corn Using AF-36 or Afla-Guard® (PLPA-FC004-2011) has been prepared by Dr. Thomas Isakeit, professor and Extension Plant Pathologist, College Station. If you have any questions regarding aflatoxin contamination in corn please contact your local County Extension Office. JW and LET

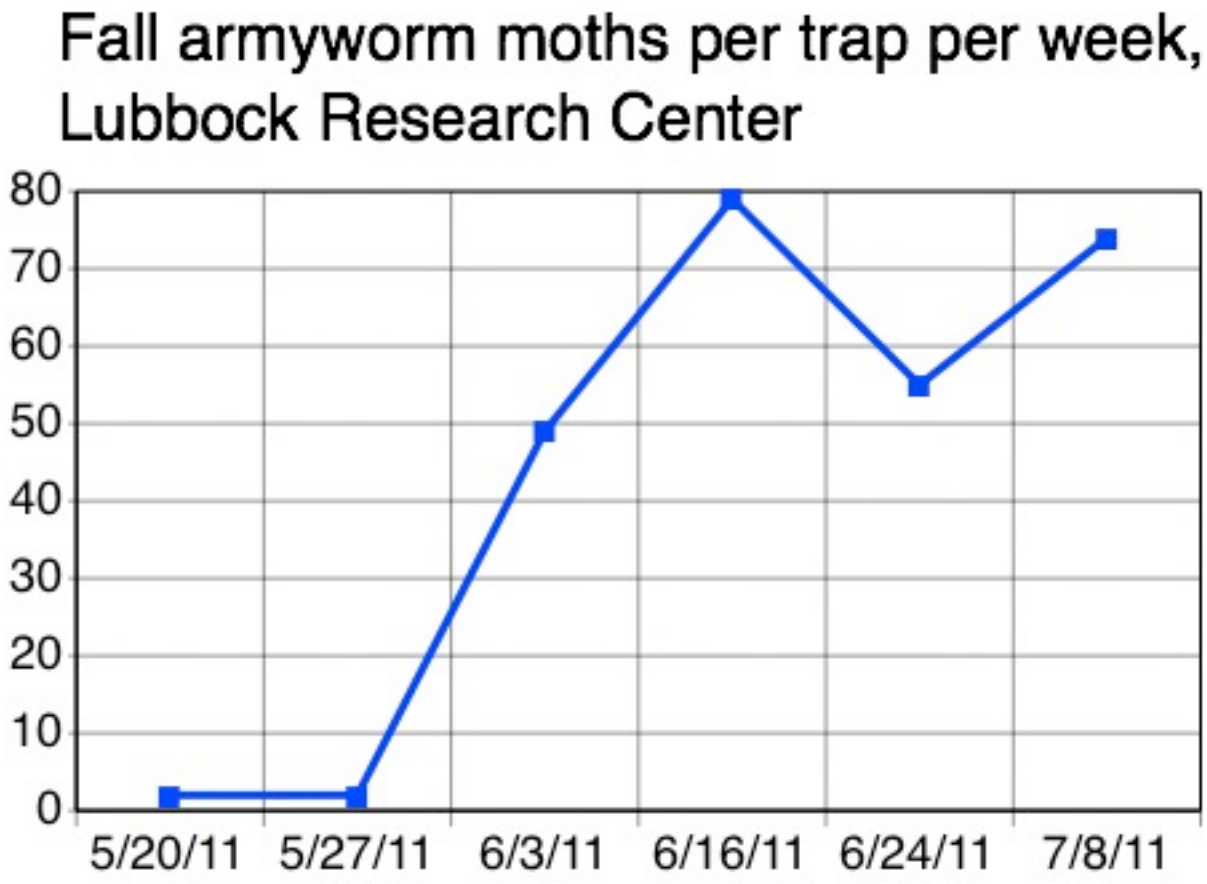
Corn and Sorghum Insects

Spider Mites

Much of our corn is at or beyond the tassel stage and spider mite numbers are highly variable. I am finding very few mites in some fields, but just down the road I can find them easily. Each field should be scouted. At the risk of repeating myself from week to week, be sure to look for beneficial species as well. Our two most prevalent and effective beneficials are the spider mite destroyer (pictured in the cotton insect portion of this newsletter) and the six-spotted thrips, which looks like any other thrips only a little bigger with six dark spots on the back of its pale body. Thresholds are presented in Managing Insect and Mite Pests of Texas Corn, and if a miticide is needed then Oberon would be a good choice after tassel. Coverage is critical so use as high a volume of water per acre as possible.

Fall Armyworm Building Up

The next flight of fall armyworm moths is well underway and I am finding them easily in sorghum now. Around 25 percent of the whorl stage plants at the Lubbock Center have one to four larvae per plant. There is not much that can be done about this because insecticides in whorl stage sorghum are largely ineffective unless applied through chemigation. However, these moths will also be laying eggs on corn as the ears form. Non-Bt refuge blocks should be scouted for fall armyworm larvae. RPP



Non-cotton Agronomy

Drought Damaged Corn - Part 2 Update

In the last edition of FOCUS I noted that the Texas AgriLife Research & Extension Center at Amarillo would be posting several items related to management and feeding value of drought damaged corn. The following items have now been posted: "Managing Heat and Water Stressed Corn in the Texas Panhandle" Brent Bean, extension agronomist, and Nich Kenny, Extension irrigation engineer, "Some points on moisture/drought stressed corn harvested prior to maturity" Ted McCollum, Amarillo, beef cattle specialist, Feed value of immature corn, Ted McCollum, Amarillo, beef cattle specialist

Also, for a primer on corn growth and development, 'How a Corn Plant Develops' from Iowa State Univ. has been updated, and is only available for sale in print copies at $14/copy, but the following URL and PowerPoint will suffice for now from other states' information: Texas, Illinois, and Kentucky.

Discontinuing Irrigation on Alfalfa during Drought

Just as corn growers are facing decisions about focusing water on limited acres, alfalfa growers may have the same concerns. The positive for alfalfa, however, is the crop's ability to recover to productive stands after months and even years of dryland and drought growth once rain and irrigation return. NMSU research fields at Tucumcari, when the annual water allotment was not available, have gone 2 years without irrigation but returned to near normal levels of historical production once irrigation resumed.

If you need to consider reducing irrigation on alfalfa one strategy may be to focus the water you have on a limited acreage (minimum 6 gallons per minute per acre), and leave the rest until better times. This will help maintain good growth on the alfalfa you continue with in order to maintain a target cutting schedule and acceptable yields and quality. The remaining alfalfa with deep roots can tough it out. If you need to choose between two alfalfa fields watered off the same irrigation system, I suggest you water the better stand, and those being equal, consider watering the alfalfa variety with a higher Fall Dormancy number (which means it is less dormant). Alfalfa with more fall dormancy is headed into initial dormancy in ~2 months (if FD 4) anyway, and you can likely keep the other crop growing a little longer into the fall. For additional information see NMSU's "Managing Alfalfa During Drought" CT

FOCUS on South Plains Agriculture

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Useful Web Links

Texas High Plains ET Network, Water Management Website, TAMU, Irrigation at Lubbock, IPM How-To Videos, Lubbock Center Homepage, Texas Agricultural Experiment Station Home , Texas Cooperative Extension Home, Plains Cotton Growers

County IPM Newsletters

Castro/Lamb, Dawson/Lynn, Crosby/Floyd, Gaines, Hale/Swisher, Hockley/Cochran, Lubbock, Nolan/Scurry/Mitchell/Jones, Parmer/Bailey, Terry/Yoakum