FOCUS on South Plains Agriculture

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

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http://texashighplainsinsects.net

http://lubbock.tamu.edu/focus

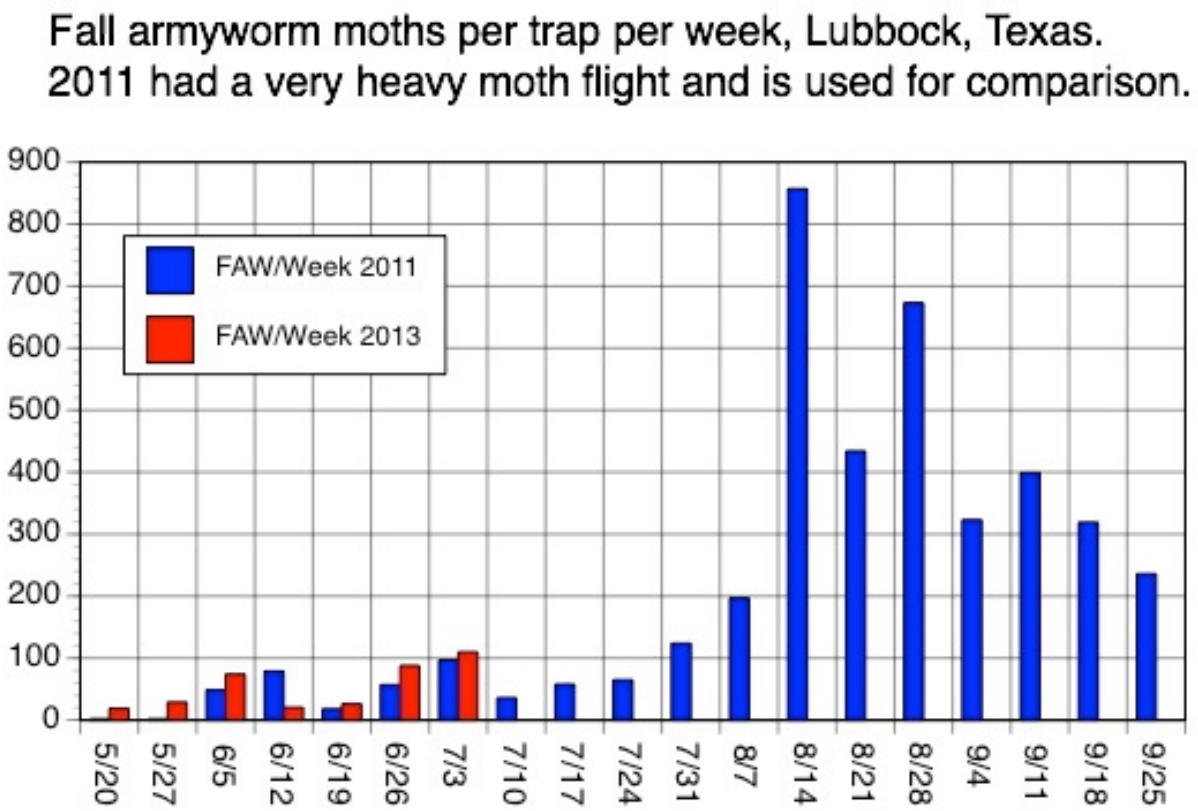
Contents:

Corn Insects

Yield loss to fall armyworm and associated fungi and optimal spray timing

Fall armyworm trap captures are up for the week and this flight, and corn earworm, will be laying eggs in corn that is at tassel or approaching tassel. The graph of fall armyworm trap captures (below) shows moth numbers approximately the same as in 2011, a dramatic fall armyworm year. This might be a good time to recap some of the findings from last year's research on fall armyworm. The Texas Corn Producers Board funded our research into the amount of yield we are losing to fall armyworm and the right time to apply insecticides to avoid that yield loss. **The bottom line is that when one fall armyworm larva gets into the bottom 2/3 of an ear the yield loss will be one-fifth to one-quarter of a pound of grain, on average.** This is due to the kernels destroyed by the insect itself and the fungi that invade the ear at that time. No one has ever quantified yield loss to fall armyworms when they infest ears and we were astounded at these numbers. However, we believe them to be correct. We also investigated spray timing and learned that insecticide applications need to be go out a few days prior to tassel or at tassel, and spraying a week after tassel may result in yield loss. All of last year's findings are presented in a 21-minute video on the Plant Management Network at http://www.plantmanagementnetwork.org/edcenter/seminars/Corn/FallArmyworm/. This year we are investigating different insecticides for fall armyworm and corn earworm control when applied at tassel. The insecticides are Belt, Endigo, Besiege and Prevathon.

Typical fall armyworm damage to ears



With Texas Corn Producers Board support, Dr. Ed Bynum, many County Extension Agents and I are contributing moth capture information to a regional reporting website located at http://amarillo.tamu.edu/facultystaff/ed-bynum/insect-surveys/ . Most counties include data for southwestern corn borer, fall armyworm and western bean cutworm. RPP

Cotton Agronomy

Cotton Crop Update

Currently, producers and insurance adjusters are evaluating the extent of the damage to the 3.7 million planted cotton acres in the Texas High Plains and panhandle regions. It will likely be a while before we have a good handle on the number of acres that were lost or abandoned due to inclement weather events or continued drought conditions. It is difficult to make a general statement about the current condition or development stages of the cotton crop. The only way to describe it, like the last two growing seasons, is that we have a "mixed bag" across the region. After visiting with producers and AgriLife Extension IPM and County Ag Agents, the best cotton is currently squaring but no blooms have been observed to date. This puts the crop slightly behind where we would generally see blooms at this time of season. Square set however, is excellent with reports of some fields at or near 100%! Although we have accumulated just over 1000 heat units (HU) as of July 2

(http://www.cottonheatunits.com/heat/default.aspx) at Lubbock, delayed emergence due to either cool temperatures, dry planting conditions, or both coupled with early season wind, hail, and blowing sand damage has resulted in delayed development. Typically, cotton will bloom at 7-9 weeks after planting with HU accumulations around 950 (varies by variety and environment). One bright spot is the low insect pressure which has contributed to the excellent fruit set being observed. Due to the developmental delay, it is highly important for producers to maintain as much of this early fruit set as possible by being vigilant with weed control, irrigation, and insect control that can rob cotton of these early squares. An open fall is not a guarantee in the Texas High Plains and an early cool snap could result in low yielding and low quality bolls from late fruit set. High weed populations compete with already struggling cotton for moisture and nutrients and may result in square shed from moisture stress. Moisture stress can also result from a delayed irrigation event. For more information on current insect situation and potential damage to squares, see entomology report in this edition of Focus by Dr. Apurba Barman. Furthermore, heat stress can result in abnormal square development, such as 4 bract squares, (figures 1-3 below) and/or square shed. This season at Lubbock, we have observed 10 - 100° F (or greater) days. Daytime temperatures have moderated recently but the local forecast remains favorable for good growing conditions and slight chances of rain. Should the rain chances come to fruition, depending on amounts and what accompanies the rain (wind/hail), it could be beneficial to struggling dryland cotton crops across the region that were fortunate enough to get early moisture for emergence and stand establishment. Although there is little a producer can do about the weather, aside of prayer, good and timely management decisions are critical under these growing conditions. Some of the management decisions have been discussed in detail in previous FOCUS on South Plains Agriculture newsletters and can be accessed on the Lubbock Texas A&M AgriLife Research and Extension Center Website (http://lubbock.tamu.edu). Topics such as in season nitrogen fertility, plant growth regulators, and tank cleanout concerns are still relevant at this point in the growing season. For more information or to discuss other concerns or considerations, please feel free to contact me at 806-746-6101 x4049 (ofc), 806-781-6572 (mob), or e-mail m-kelley@tamu.edu. MSK

Cotton Disease Update

Damage caused by the root-knot nematode (*Meloidogyne incognita*) continues to be observed throughout the Southern High Plains. As much as 40% of the irrigated cotton acres in the region are thought to be infested with this pest; however, damage is most severe in sandy textured soils. Nematode related losses are commonly observed to the south and west of Lubbock, in areas such as Dawson, Gaines, Hockley, Lamb, Terry and Yoakum counties. A more detailed description of root-knot damage and management options can be found in the Cotton Disease Update section of the previous issue of Focus on South Plains Agriculture (http://lubbock.tamu.edu/files/2013/06/June_21_3013.pdf). Following sporadic rain showers, there has been an increase in reports of Fusarium wilt. This disease is caused by the soilborne fungus, *Fusarium oxysporum* f. sp. *vasimfectum* and

most often occurs in conjunction with *M. incognita*. The warm temperatures experienced over the past few weeks favors development of Fusarium wilt. Furthermore, symptoms of this disease first occur approximately 30-40 days after planting, which coincides with the completion of the first generation of *M. incognita*. Subtle differences in the appearance of Fusarium wilt symptoms have been observed. The most common symptom consists of chlorosis (or yellowing) on the margin of leaves, which progresses into an overall loss of turgor pressure and wilting of leaves. Defoliation of lower leaves may occur. Ultimately, plants will wither and die, resulting in reduced plant stands or large patchy areas within the field. As with plants exhibiting symptoms of Verticillium wilt (another disease common to the High Plains and caused by the fungus *Verticillium dahliae*), inspection of stems will reveal a discoloration of the vascular system. A cross section of the stem will show a dark brown ring around the outer potion of the vascular system. An additional symptom, collar rot, has been observed on infected plants early this season. Collar rot symptoms appear as sunken or girdled lesions on the hypocotyl, which can be mistaken for wind damage or seedling disease caused by *Rhizoctonia solani*. The drought conditions experienced the last few years have negatively affected development of Fusarium wilt; however, useful information has been gleaned from variety trials conducted in fields with a history of Fusarium wilt. Several varieties have consistently performed well in previous trials and others are currently being evaluated. Preliminary results on some of the newer varieties will be provided as they become available. If you have any questions regarding Fusarium wilt or any other cotton diseases, contact Jason Woodward @ 806-632-0762, or via e-mail jewoodward@ag.tamu.edu. JW

Symptoms of Fusarium wilt:
Wilting of leaf margin (top) and plant mortality (bottom).

Chlorosis and necrosis of leaf margin caused by Fusarium wilt.

Discoloration of stems from plants exhibiting Fusarium wilt (cross section).

Large patches of cotton affected by Fusarium wilt.

Cotton Insects

Prevalent caterpillar pests in cotton during mid to late growing season

Approximately 50% of the cotton acreage in the Texas High Plains region is planted with non-*Bt* technology cotton varieties. These varieties do not have the innate ability to protect the plants from caterpillar pests. Historically, the caterpillar pest pressure in this area has been relatively low as compared to other cotton growing regions. However, for past several years we have seen an increased number of moths in our pheromone traps. This could possibly translate into a potential increase in caterpillar infestation levels in cotton. Among the caterpillar pests, cotton bollworms, beet armyworms and fall armyworms are the most common and could result in significant yield losses if economic threshold levels are exceeded. These insect pests are primarily seen in our cotton fields during the mid to late growing season period. It is possible that a cotton field could be infested by one or more of the above mentioned insect species at the same time. From a management perspective, it is important to know which pest species are present in your cotton so that an effective control method can be selected. In this article, I provide a brief description for each of these three caterpillar pests, which will hopefully assist you in distinguishing between these species.

Beet armyworm

Moths (adult) of the beet armyworm, *Spodoptera exigua,* are grayish-brown in color and about little more than ½ inch in length. Eggs are found in clusters of 50-60 eggs which are covered with white, fuzzy scales. These white egg clusters are located mostly on the underside of the leaves, but they can also be found on the upper surface of leaves. Small larvae are green in color, but bigger larvae (3rd instar and beyond) acquire pale yellow stripes. Larval populations disperse and feed individually after larvae become bigger in size. One method of distinguishing beet armyworm larvae from bollworm larvae is by observing the beet armyworm's hairless, smooth body relative to the cotton bollworm which has more small hairs (setae). In addition, beet armyworm larvae possess a dark spot laterally on each side of the second body segment (mesothorax) behind the head.

Once the eggs hatch, small larvae feed gregariously (in groups) on the leaf tissues, turning the leaves into a sclerotized, windowpane-like structure. These feeding sites are often called "hits" and are counted when scouting cotton for pests and this information is utilized in assessing potential beet armyworm crop injury estimates. Besides heavily feeding on leaves, beet armyworm larvae also feed on all sorts of cotton fruiting structures ranging from small squares to bolls. Once larvae feed on the fruiting structures, fruits are completely damaged and tend to fall off the plant.

Fall armyworm

Fall armyworm, *Spodoptera frugiperda,* is a closely related species to beet armyworms. Egg masses of fall armyworm are covered with tan colored scales. Moths with wings expanded are about 1½ inches. The moths are dark grey in color, mottled with patches of white and yellow. Newly hatched, young larvae are pale in color with a black head. Mature larvae become darker in color and bear light cream colored stripes along the upper side of the body. The most distinguishing character to separate fall armyworm larvae is a white inverted "Y" mark on the head.

Fall armyworms feed indiscriminately, both on foliage and fruiting structures. Under high population pressure, cotton plants can be significantly defoliated, essentially often leaving only the stems of the plant. They can also be observed feeding and resting on the flowers of cotton. Large-sized bolls are found with holes resulting from fall armyworm larval feeding. Small larvae can be found in the bracts of developing bolls and they nibble on both bolls and bracts. While scouting, look closely in the spaces between bracts and the fruit, where small larvae tend to hide.

Bollworm

The cotton bollworm, *Helicoverpa zea,* is another serious caterpillar pest of cotton. There is another species closely associated with the bollworm, which is called the budworm or tobacco budworm (*Heliothis virescens).* Typically, both of these species are considered together as a single pest complex. There are morphological differences between these insect species, but to keep this article simple, I only consider bollworm to represent this pest complex. Bollworm moths are much larger than beet armyworm moths. Their color varies between yellow-brown to cream colored tones. There are two dark spots near the center of each forewing. Unlike beet armyworms and fall armyworms, bollworm eggs are found laid singly. Larvae acquire different colors and have hairs (setae) on their body. Small larvae may feed on young terminals and squares, while late instar larvae primarily feed on developing flowers and bolls. This is in contrast to the beet armyworm and fall armyworm larvae, which mostly feed on the foliage. As compared to beet and fall armyworms, bollworms are often considered a more serious pest of cotton because they primarily damage the fruiting structures, thus resulting in greater economic losses.

Scouting and economic threshold

Cotton fields need regular monitoring at 3 to 5 day intervals during the early to late season fruit developmental stages in order to detect potentially damaging infestations by caterpillar pests. Scouting for these pests involves thorough inspections of whole plants including the leaves, terminals and all fruiting structures. Typically, 10 consecutive plants at several random locations within a field should be inspected thoroughly (whole plant inspection). For more information on scouting for each of these insect species, please consult the "Managing Cotton Insect Guide", a publication by the Texas A&M AgriLife Extension Service. Records should keep on the percent damage fruit, types of larvae, number of larvae, size of the larvae, type of cotton cultivar, growth/reproductive stage of

the crop, etc. All of this information can be used in the decision-making process, whereby you can calculate your pest population and can then be compared to recommended action thresholds for these three caterpillar pests. Action thresholds and the associated plant developmental stages for all three caterpillar pests are given below.

Action threshold for beet armyworm

Cotton Stage	Feeding site	< ¼ inch larvae		> ¼ inch larvae
		Overall, ≥ 10% infested plants and		
Prior to 5 NAWF*	Mainly leaf	20,000 larvae/acre	or	14-24 larvae/100 plants
	Fruiting structures	4,000-8,000 larvae/acre	or	8-12 larvae/100 plants
After NAWF	Leaf or fruit	20,000 larvae per acre		

*NAWF = nodes above white flower

Action threshold for fall armyworm

Cotton Stage	Terminal and fruit inspection	Whole plant inspection
Prior to 1st bloom	30% damaged squares	10,000-20,000 small larvae/acre
After 1st bloom	15-25 small larvae per 100 plant terminals and 5-15% damaged squares or bolls*	

*If the number of fall armyworm is high, it is not recommended to wait for 5-15% damaged squares or bolls.

Action threshold for bollworm and budworm

Cotton Stage	Worm size	Non-Bt cotton	Bt cotton
Before bloom	all	≥ 30% damaged squares and worms are present	
After boll formation	≤ ¼ inch	10,000 worms/acre	Treatment not needed
	> ¼ inch	5,000 worms/acre	5,000 worms with 5-15% damaged fruit

Management

Planting cotton with second generation *Bt*-technology (Bollgard® II and WideStrike®) has prevented economically damaging infestations from most of the caterpillar pests in our region's cotton. Bollworms have typically been easily controlled by this technology alone, but heavy fall armyworm populations in *Bt*-technology cotton may sometimes require one or more additional insecticide applications. Beneficial insects such as predators (assassin bug, lacewing, big-eyed bug, etc.) and parasitoids (*Cotesia marginiventris*) are effective in suppressing caterpillar pests when pest populations are small. While making chemical applications, it is recommended not to use pyrethroids since they are harsh on natural enemies and also less effective on late instar caterpillars. In addition, pyrethroid applications might 'flare up' aphid populations in cotton. Timely applications are important for controlling caterpillar pests since smaller larvae (1-2 days old) are more vulnerable to

insecticides than more advanced life stages. Some of the effective products against mixed population of caterpillar pests are: Prevathon® SC @ 14-27 fl oz/acre, Besiege™ @ 6.5-12.5 fl oz/acre, Belt® SC @ 2-3 oz/acre, Steward® EC @ 9.2-11.5 fl oz/acre, and Intrepid 2 @ 4-10 oz/acre. AB

Beet armyworm

Photo Credit: Apurba Barman

Fall armyworm (top) vs. cotton bollworm (bottom)

Photo Credit: Patrick Porter

Adults

Non-cotton Agronomy

General Last Recommended Planting Dates—Texas South Plains

This remains the most frequent question I am discussing with producers in the past 10 days. These guidelines provide a planting target that is highly likely to avoid early freeze and frost injury and adequately mature a crop. Most years producers could probably plant a little later and be OK, but risks begin to increase. For any of these crops planting one day earlier is worth two to three days of heat unit accumulation (hence maturation) vs. late September and early October. In the early freeze of 2008, heat unit calculations for grain sorghum suggested that farmers who planted five days sooner (e.g., June 30 vs. July 5) would have matured their grain sorghum up to 16 days earlier. In that particular year, planting date really mattered.

Crops that are now past their last recommended planting date are included for comparison to the remaining options.

South Plains Region	Counties
Northwest:	Parmer, Castro, Bailey, northern Lamb, Cochran
Central:	Swisher, Briscoe, southern Lamb, Hale, Floyd, Hockley, Lubbock, Crosby, Yoakum, Terry
Lower:	Lynn, Garza, Gaines, Dawson, Borden, Scurry, Andrews, Martin, Howard, Mitchell

a table follows on the next page

Crop	Northwest	Central	Lower
Grain Sorghum			
Medium maturity	6/25	6/30	7/5
Medium-early maturity	6/30	7/5	7/10
Early maturity	7/5	7/10	7/15
Sunflower	7/5-12	7/10-17	7/15-22
Guar	6/25	6/30	7/5
Sesame	6/20	6/25	6/30
Black-eyed pea, Pinto, Green bean	7/5	7/10	7/15
Summer annual forages			
Sorghum/sudan, Sudangrass, and hybrid pearl millet	7/20	7/25	7/30
Forage sorghum	7/1	7/5	7/10
Soybean	6/30	7/5	7/10
Peanuts			
Spanish	5/20	5/25	5/30
Valencia	5/30	6/5	6/10
Corn			
115 day relative maturity	6/10	6/15	X
110 day relative maturity	6/20	6/25	X
105 day relative maturity	6/30	7/5	X
Corn silage	Up to 14 days after above hybrid relative maturity		

Huskie Herbicide—Mid-summer Review

As producers have planted many tens of thousands of grain sorghum in the past several weeks another round of the same general Huskie herbicide questions have arisen from producers who are considering Huskie for the first time. For a more thorough summary on Huskie, review the AgriLife Extension PowerPoint at http://lubbock.tamu.edu/files/2013/03/Huskie-Grain-Sorghum-Summ-Feb13-Trostle.pdf

Key considerations include:

- In spite of how effective Huskie appears to be I believe that your pre-plant/pre-emerge weed control program remains the most important decision you make in your weed control program for grain sorghum. Let Huskie take the role of eliminating weeds that make it past your PP/PPI program.
- Timing of application for grain sorghum is 3-leaf stage to 12" tall (about the 8-leaf stage, or about 30-35 days after planting).
- The label all but encourages use of atrazine with Huskie to enhance weed control. Bayer now recommends: 1 pint of Huskie + 1 pint of atrazine + 1 lb. of ammonium sulfate (AMS) per acre
- One pint of atrazine should not create significant concerns for rotation back to cotton except for the sandiest of soils.
- If you have already applied atrazine, however, as part of a pre-plant/pre-emerge weed control program, be cautious with any additional atrazine. If this is a concern talk to your chemical dealer, Bayer rep, or our AgriLife herbicide staff.
- Low to modest Huskie injury on grain sorghum may occur, but it is acceptable. A quick flashing, or burn, of the existing leaves is expected, but injury levels have been modest and the grain sorghum quickly grows out of the injury with no apparent lasting effect on grain sorghum.
- Do not pair Huskie with propazine (Milo-Pro), which appears to have some antagonistic effect according to Texas A&M AgriLife weed control scientist Dr. Peter Dotray. CT

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Useful Web Links

Water Management Website, TAMU, Irrigation at Lubbock, IPM How-To Videos, Lubbock Center Homepage, Texas AgriLife Research Home , Texas AgriLife Extension Home, Plains Cotton Growers

County IPM Newsletters

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