FOCUS on South Plains Agriculture

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

Cactus coreid, *Chelinidea vittiger*, feeding on cactus. Photo Credit: Patrick Porter

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http://texashighplainsinsects.net

http://lubbock.tamu.edu/focus

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Cotton Insects

Lygus bugs in the Texas High Plains and their threat to cotton

There are several species of Lygus reported to infest different crops including cotton. However, the dominant species of Lygus bugs we normally find in High Plains cotton is the western tarnished plant bug (Lygus hesperus), which accounts for approximately 97% of our Lygus population. Adult insects are about ¼ inch long, oval, greenish in color with reddish brown to black markings on wings and a prominent black triangle in the back (see figure 1). Immatures or nymphs look similar except they do not have wings. Their sizes vary with the developmental stage, but they are greenish in color, have black dots on the back and tip of the antenna is reddish in color (see figure 1).

Lygus bugs are one of those insect pests which can be damaging during the critical developmental stages of cotton fruit; from squaring to boll formation. Both adults and immatures are capable of causing injury to cotton fruits. Feeding injury during the early crop development stages can result in significant square loss, but this situation is not typically observed in High Plain cotton where Lygus are more commonly recognized as a mid to late season cotton pest. When Lygus feed on either developing flowers or bolls, they are capable of damaging the inner contents of a fruit such as anthers in case of squares/ flowers and developing seeds in case of young bolls (see figure 2). However, as boll development progresses, the outer wall of the bolls become hard and become less susceptible to Lygus injury. In terms of heat units, cotton beyond 350 heat unit after "cut-out" (i.e., 5 or fewer mainstem nodes above white flower) is considered to be safe from Lygus.

Typically, we observe our Lygus populations being more noticeable in cotton after peak flowering to the late boll development stage. However, their populations may build-up in cotton even before flowering and in that situation, the cotton crop is more vulnerable to damage by this insect. A research study conducted by Apurba Barman and Megha Parajulee for three years (2006 to 2007) in Lubbock quantified the amount of fruit loss and lint yield difference caused by artificially released Lygus at two different densities (1PP = one Lygus bug per plant and 3PP = three Lygus per plant) as compared to plots of undisturbed crop which were either not sprayed (NC = natural control, no spray and no artificial Lygus release) or protected through regular pesticide applications (SC = three weekly sprayings). It was found that the extent of fruit loss four weeks after three consecutive Lygus releases could be as high as 38% under high insect pressure (3 Lygus per plant) and 24% under low insect pressure (see figure 3). Although it was not proportionate to the amount of fruit loss, the lint yield was significantly less on plots receiving artificial Lygus releases. This study also indicates that the presence of Lygus in cotton fields during the squaring stage can reduce lint yield in the realm of 100 lbs/acre (see figure 4). Details of this study can be found in the article recently published in the Journal of Economic Entomology by the Entomological Society of America.

The recommended action threshold for Lygus in High Plains cotton varies with the crop stage and method of sampling. Several sampling methods such as drop cloth, sweep net and

beat-bucket can be used to assess the abundance of Lygus in cotton fields. For more information on sampling and the action threshold, consult the Texas A&M AgriLife Extension publication, "Managing Cotton Insects in High Plains, Rolling Plains, and Trans Pecos Areas of Texas".

Lygus action threshold

Cotton stage	**Sampling method**	
	Drop cloth	***Sweep net***
First two weeks of squaring	1-2 per 6 row-feet with unacceptable square set	8 per 100 sweeps with unacceptable square set
Third week of squaring to first bloom	2 per 6 row-feet with unacceptable square set	15 per 100 sweeps with unacceptable square set
After peak bloom	4 per 6 row-feet with unacceptable fruit set first 4-5 weeks	15-20 per 100 sweeps with unacceptable fruit set first 4-5 weeks

Cotton fields should be regularly monitored so that early Lygus population build-up can be detected. Studies in other parts of the country where Lygus is a pest of different crops suggest that this insect could be difficult to control. Research conducted in the Mississippi Delta region indicates that Lygus lineolaris (another close relative of our western tarnished plant bug) has developed resistance to acephate. However, in the Texas High Plains, there are no issues of acephate resistance in Lygus populations. Luckily, Lygus pressure in High Plains cotton has been fairly low and area specific, therefore our populations have never received multiple, area-wide insecticide applications as occurs in some other regions where Lygus is more troublesome. Insecticides that can be used for managing Lygus in cotton are: Centric® 40WG @ 1.25-2.5 oz/acre, Intruder® WSP @ 1.1 oz/acre, Belay® @ 3-6 oz/acre, Orthene® 97S @ 4-16 oz/acre, Carbine™ 50WG @ 1.7-2.8 oz/acre, Admire Pro® 1.3-1.7 oz/acre and Transform® WG 1.5-2.25 oz/acre. Under heavy Lygus pressure, use of the highest dose is recommended to obtain satisfactory control.

Another aspect of Lygus management is understanding the abundance and phenology (growth stage) of alternate host plants of Lygus in the landscape. Alfalfa is commonly recognized as the most preferred host for Lygus and the presence of volunteer alfalfa (present along roadways) can attract Lygus and allow them to build up their population densities. However, alfalfa is less abundant in the High Plains landscape, instead there are several other host plants such as pigweed, Russian thistle, smartweed, woolyleaf bursage and yellow sweetclover that can be found in and around the perimeters of our cotton fields. Among these weed hosts; Russian thistle is a better host in terms of supporting both adults and immatures of Lygus. This was found through a two-year Texas High Plains study conducted by Stanley Carroll and Megha Parajulee in which dozens of prevalent weed species in the landscape were sampled for adult and immature Lygus bugs. Thus, checking some of these weed species near cotton fields can give us an idea if there is any potential for a future invasion by Lygus into the cotton field. AB

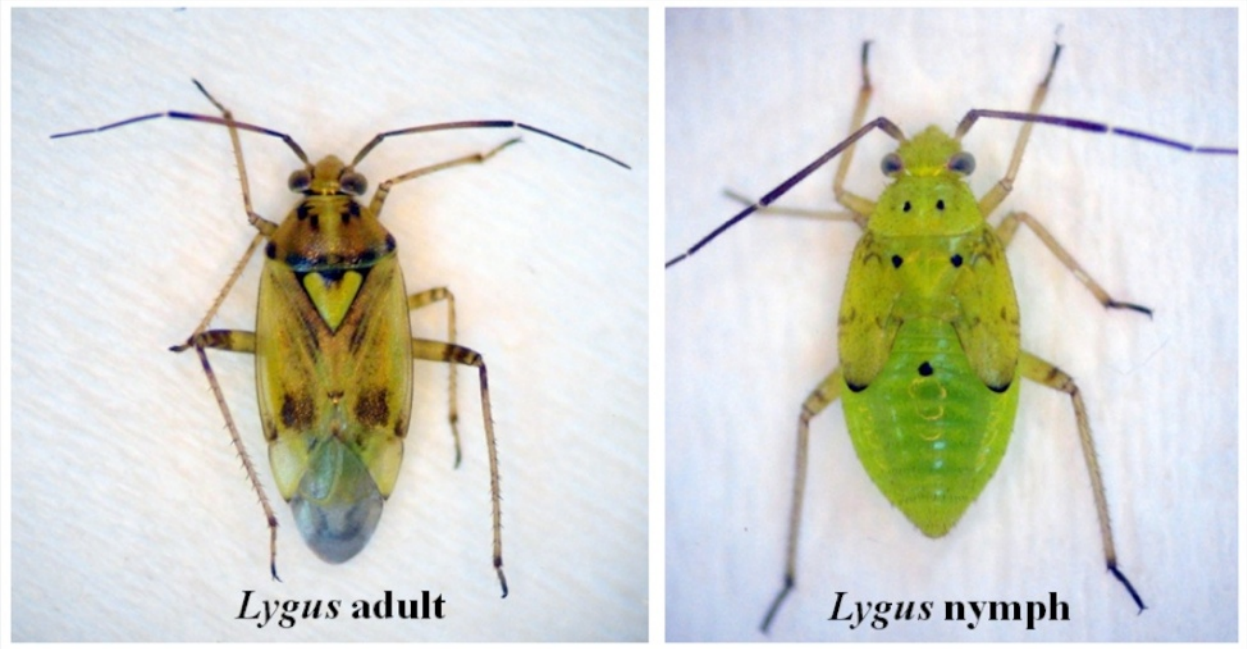


Figure 1. Adult and immature (nymph) of western tarnished plant bug (Lygus hesperus). Note the triangle on the back in adult and black dots on nymph. (Photo credit: Cotton Entomology Program, Lubbock, TX)

Figure 2. Symptom of external injury to cotton bolls by Lygus (picture on the left). Comparison of healthy and Lygus infested cotton bolls after cutting the bolls open (picture on the right). (Photo credit: Cotton Entomology Program, Lubbock, TX)

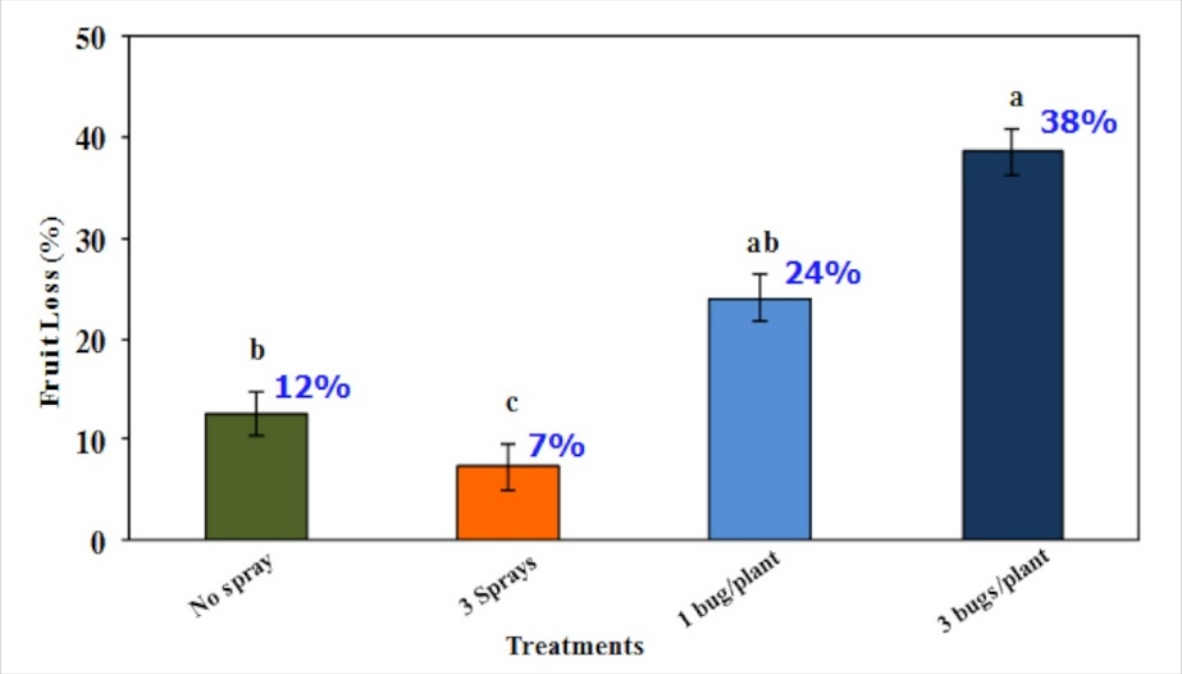


Figure 3. Percent fruit loss caused by Lygus in two different population densities released on early squaring cotton.

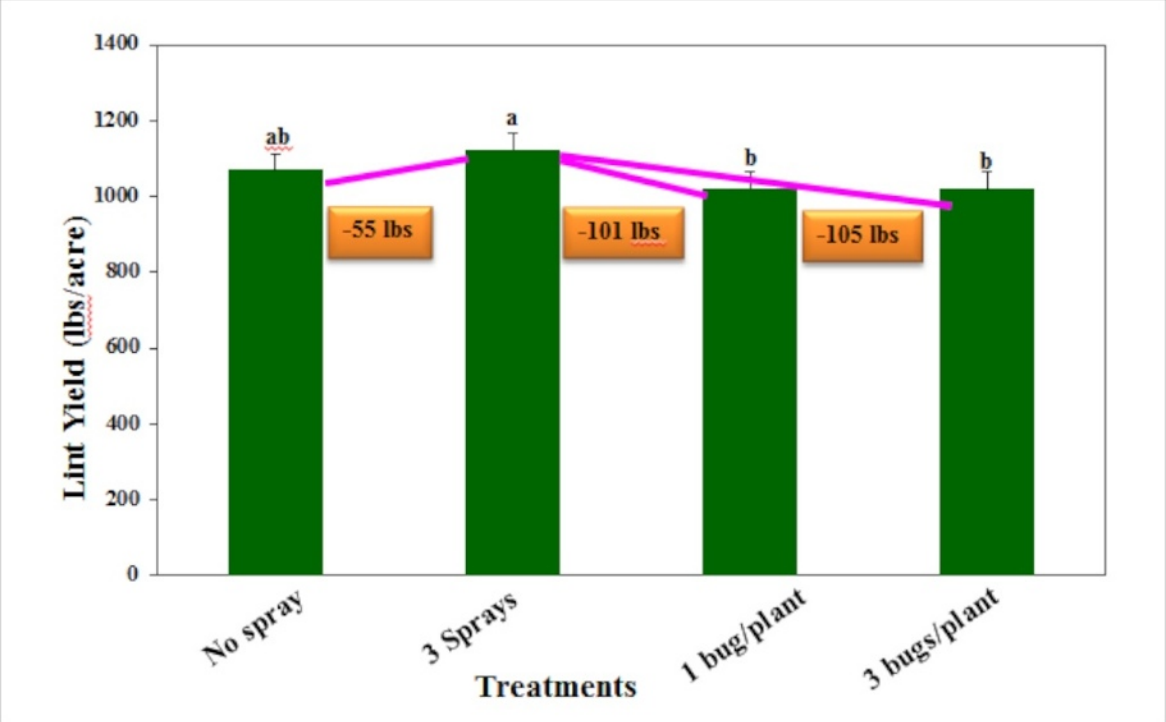


Figure 4. Lint yield difference in Lygus infested plots and plots treated with insecticides.

Cotton Agronomy

Cotton Crop Update

The May 2nd freeze, resulting in later than usual planting, crop damage from June hail and wind events, and the continued severe drought conditions in the Texas High Plains and Panhandle make it difficult, if not impossible, to generalize the current cotton crop conditions. Some of the irrigated crops that either escaped significant hail/wind damage or were planted into a cover crop are at early bloom, but they are still slightly behind as blooming typically starts in early July. As for the remainder of the crop, growth stages vary greatly across the region under irrigated production systems and range from pinhead to candling square stage. The condition of the remaining dryland cotton crop also varies greatly across the region as a result of the sporadic and scattered rainfall events observed to date. Those locations that received rain and got a stand established are struggling and in need of additional moisture to continue, or in some cases, resume growth and development. Unfortunately, in most cases, these dryland cotton crops exhibit skippy stands and are well behind developmentally. The fate of many of the remaining dryland acres is yet to be determined. At the time of this writing, July 17, much of the region has received, or is currently receiving, some rainfall from a system that is moving slowly across the area. According to the Texas Tech Mesonet website, 72 hour rainfall amounts range from a trace to just over 6" across all of the station locations. Plainview currently has observed 6.21" over that time period. Other locations with high rainfall amounts include Denver City (3.95"), Sundown (3.54"), Plains (3.13"), and Wolfforth (2.75"). The Lubbock TTU and the Reese Center stations have reported 1.96" and 2.34", respectively over the past few days. Irrigated producers should get benefit from this slow moving steady rainfall event. With occasional breaks in the clouds, the potential for square shed should be minimized. Extended periods of cool, cloudy conditions can result in square shed. To date, percent square set under irrigated production systems has been exceptionally good across most of the region. This is attributed greatly to the light early season insect pressure that has been observed. Additionally, due to the lateness of the current cotton crops, and the uncertainty of additional rainfall, it is highly recommended that timely irrigation, insect control, and weed management decisions be made in order to maintain the current set fruit. With good growing conditions for remainder of the season and an open fall, good yields of high quality cotton is very possible in the Texas High Plains and Panhandle regions. MSK

Cotton Disease Update

Although few blooms were observed on the fourth of July, flowering is in progress in many fields across the Southern High Plains. Water demand will continue to increase over the next several weeks as the crop reaches peak bloom. While the cooler temperatures and

widespread rainfall received in the region are welcome, such conditions are ideal for the development of Verticillium wilt, caused by the soilborne fungus Verticillium dahliae. The pathogen has a broad host range of more than 400 plant species that can be infected, with peanut being one of the most susceptible rotation crops grown with cotton in west Texas. It is important to know the history of a field with respect to Verticillium wilt, as the fungus can survive for extremely long periods of time in the soil (as specialized structures, called microsclerotia). Disease incidence and severity have been relatively low for the past two years, as a result of the extreme drought conditions experienced across the region.
Initial infections occur early in the growing season, following germination of microsclerotia (which respond to root exudates, released in the soil by cotton seedlings). The fungus penetrates through the roots, invades the vascular system resulting in a systemic infection. Prolific growth in the xylem vessels disrupts the plant's ability to transport water and nutrients. Characteristic symptoms of Verticillium wilt consist of chlorosis and/or necrosis on the foliage of infected plants (See picture #1). As the disease progresses, severe stunting (See picture #2) and premature defoliation can be observed. A transverse section of the stem will expose discoloration of the vascular system (See picture #3). Younger bolls may abscise or become malformed. Symptoms of Verticillium wilt are easily confused with another disease (Fusarium wilt, caused by Fusarium oxysporum f. sp. vasinfectum) that has been observed over the past few weeks. While the two diseases have a similar appearance, management options (primarily variety selection) differ greatly. More information on Fusarium wilt can be found in the previous issue of Focus on South Plains Agriculture.
Distinction between the two wilt diseases in cotton may require laboratory diagnosis. Texas A&M AgriLife Research Plant Pathologist, Terry Wheeler continues to evaluate cotton varieties and advanced breeding lines for resistance to Verticillium wilt. Results from field trials conducted across the west Texas in 2012 found several varieties, which performed consistently across three locations (See table #1). The performance of other varieties evaluated last years trials are presented in the Verticillium wilt test results, 2012.
The effects of several management options on Verticillium wilt are being evaluated in various research trials. Results from such studies will be distributed as they become available. For more information on the integrated management of this disease can be found at the following web address http://lubbock.tamu.edu/files/2011/11/IntegratedManagementVerticilliumWiltCotton.pdf. If you have any questions regarding Verticillium wilt or any other cotton diseases, contact Jason Woodward @ 806-632-0762, or via e-mail jewoodward@ag.tamu.edu. JW

Verticillium wilt foliar symptoms

Stunting caused by Verticillium wilt

Vascular discoloration caused by Verticillium wilt

Corn and Sorghum Insects

Threat assessment after the rain

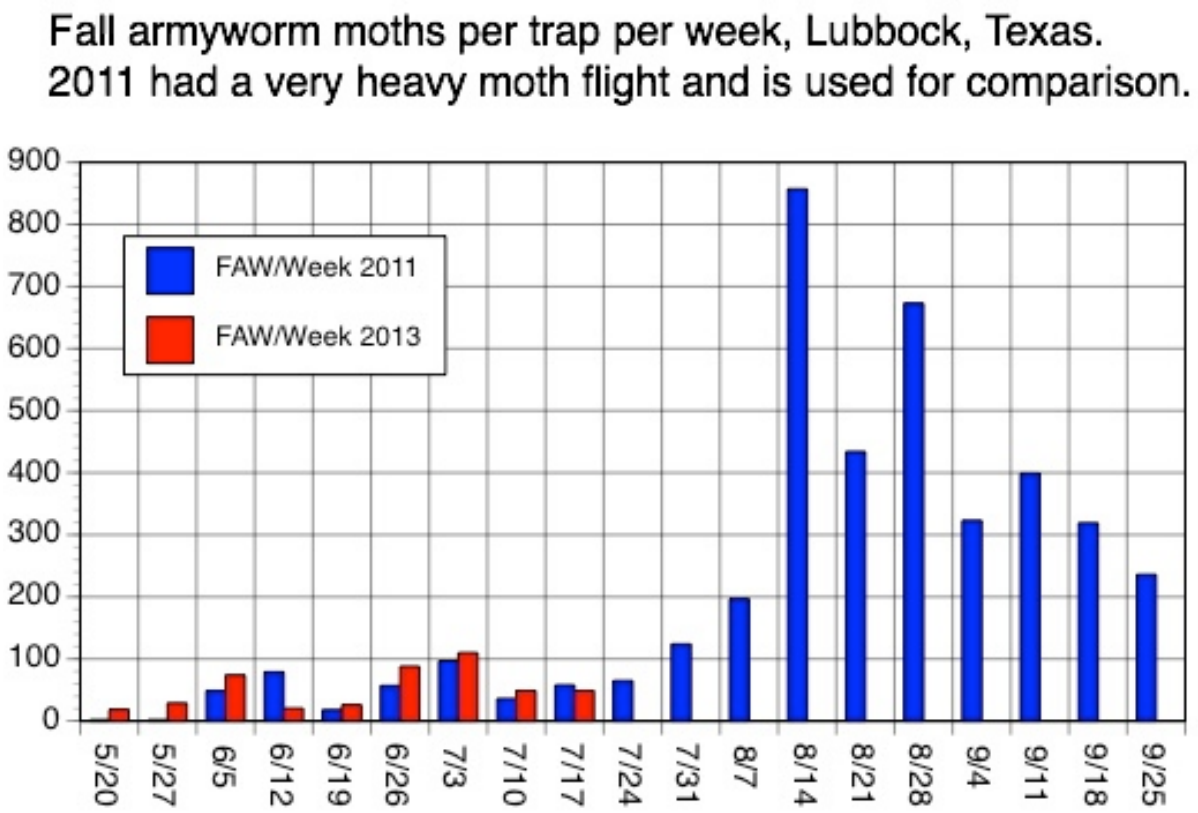
What a difference a general rain makes. Areas that received significant rainfall on Wednesday and Thursday now have a reduced spider mite risk. Adding to that, the hot and cool and hot again temperature cycles are more disruptive to spider mite development than a constant hot temperature regime. The higher humidities of the last few days have also increased the chance of Neozygites fungi establishing themselves as a biological control agents. So the spider mite threat is less today than when we started the week. That being said, all corn fields should be scouted weekly for spider mites as they approach tassel. We are not safe; Monti Vandiver, IPM Agent in Bailey and Parmer counties, just told me that he had some fields where the mite populations were approaching treatable levels. He is going to reevaluate them after the rain stops. Corn is susceptible to yield loss from spider mite damage until it reaches full dent stage. Dr. Ed Bynum, the Extension Entomologist in Amarillo, is recognized as the Grand Old Man of spider mite knowledge. He has just released an excellent comprehensive presentation on spider mites in corn hosted at the Plant Management Network.

Fall armyworm moth numbers are tracking almost identically to those in 2011, a year where we had significant fall armyworm damage in corn and sorghum (see graph below). It is too early be sure of what lies ahead, but the recent rains probably won't be much of a factor in reducing fall armyworm numbers. It is true that small to medium sized larvae in whorls can drown with heavy rain, but it is also true that the smaller fall armyworm predators and parasites will drown, too. I have seen many very small parasitic wasps in corn and sorghum in the last week and I think the rain has probably greatly reduced their numbers. If I had to guess, I would predict that we will continue to see the same fall armyworm population growth pattern that we saw in 2011.

I am finding more than the usual number of small corn earworm larvae in corn ears. The good news, at least for corn, is that corn earworm is a cannibal and the larvae will eat each other until there are just one or two per ear. The bad news is that the corn earworm is the cotton bollworm and high populations now might be pointing to increased damage on non-Bt cotton later in the season when egg laying shifts to cotton and headed sorghum. Corn earworm and fall armyworm are the headworm complex in sorghum. I looked at approximately 100 corn ears yesterday and there were an average of 7.6 small corn earworm larvae per ear, and this indicates healthy numbers of adults on the wing. Bt corn is safe from economic damage by corn earworm and it usually does not pay to spray non-Bt corn for this insect because almost all of the kernel damage is confined to the tip of the ear. Fall armyworm is a different matter though, and you can read the last issue of FOCUS for a summary of what fall armyworm is capable of causing in terms of yield loss in corn.

Sorghum maturity is spread out this year, and that raises the risk of sorghum midge building up on earlier planted fields then moving progressively to later and later planted fields with higher populations as they go. Sorghum fields should be scouted as they enter

into bloom. Since midge females live for only a day, the fields should be re-examined frequently during blooming so there won't be any surprises. RPP



Non-cotton Agronomy

The Rains and the Rest of the Summer

The rains this week don't yet make our crop for the summer for dryland unless you received many inches; they just put us back in the ballgame. The NEXT rains will determine where we go. With that in mind as Pete Dotray, Wayne Keeling, and others will note, keep an eye on your weed issues. Some areas of the South Plains finally have enough moisture to trigger potentially major weed activity.

Is it truly too late to take a chance on grain sorghum?

Yes. Of course we can find those in the past that have had a successful crop planting this late, but it may be early next week before some fields dry out enough to plant. One Lubbock County grower asked on July 17 about still planting early maturity grain sorghum and "see what happens." But it will be several days before he can plant so it is truly too late. For a Lubbock Co. example, if we could get a true early maturity hybrid in the ground on July 21 (allowing for drying), then at 55 days to half bloom (half of the plants in the field

initiating bloom), that takes us to Sept. 14, then allow another five weeks to reach reasonable physiological maturity in the seed—that's Oct. 19. Growth by then has for all practical purposes has ceased by about a week earlier. Remember that 1 day of heat accumulation in these days of July is worth 2 to 3 days in early October.
A more suitable alternative is sorghum/sudan or haygrazer. You do not need a physiological seed maturity and, with favorable conditions the rest of the summer, yield of 1.5 tons/A is certainly feasible. For dryland for seeds of ~15,000 seeds/lb. then 15 lbs./A is a good target, but even 10 lbs./A will give adequate results. Some haygrazers like the "three-way cross," or the sorgo-sorghum/sudans, may have seed size of near 20,000 seeds/lb. If that is the case you can reduce your per-acre seeding rate.

Mid-Season Nitrogen on Grain Sorghum

With rainfall support some producers may now actually consider fertilizing grain sorghum that was planted late. This will depend on the amount of N you might have had on cotton ground that failed. Grain sorghum's requirement is about 2 lbs. of N per acre per 100 lbs. of yield goal. I like for this N to be applied within 30 to 35 days of planting to ensure the N is "in the system" at the time when the all-important growing point differentiation occurs.
If you are irrigated, the bulk of this N should still be applied by 30-35 days after planting, but if you trickle out smaller amounts of N, then you might hold back 20% and fertigate, but for a medium-early maturity hybrid I recommend you still complete N applications with 50 days of planting.
If you have soil test information that indicates significant soil nitrate N then it should be credited toward your crop requirement. Be sure in your applications, however, to minimize root pruning with knife rigs or rolling coulters.

Iron (Fe) Deficiency in Grain Sorghum

Iron deficiency is related to caliche soils and outcroppings in West Texas (usually pH ≥ 7.9) or frequent alkali spots in fields (Coastal Bend, South Texas). This is a particular concern for sorghum. Chalky soils that appear whitish across the field should probably never have grain sorghum, and it is prohibitively expensive to correct it. Many fields, however, simply experience some degree of iron deficiency, the classical condition of interveinal chlorosis where the veins of the younger leaves remain green and the leaves are yellow between the veins (Figure 1). In the worst of cases, the leaves are almost completely bleached out and the plants do not grow.

Iron deficiency can also be induced temporarily due to water-logged conditions and possibly fast growth in young sorghum (root system not well established yet) or a possible response to herbicide (replant situation where residual is present or a subsequent post-emerge application). In modest cases where iron deficiency occurs, as the root volume expands iron deficiency diminishes. On the other hand, strong cases of iron deficiency in grain sorghum may merit treatment at as early as 10 to14 days after emergence.

Iron deficiency compared to N deficiency. Iron deficiency is normally expressed mostly on newest leaves, and iron is immobile within the plant. When iron becomes available again, newly emerging leaves will again be dark green. Older chlorotic leaves will not green up unless they receive a direct foliar feed. In contrast, N is mobile in the plant, and will move to the youngest leaves from older plant tissues (which may express N deficiency) and shows no striping symptoms.

Most soil tests will flag Fe < 4 ppm as deficient. Currently, there are no economical sources of soil-applied Fe available. Therefore, the only options for correcting Fe deficiencies are to apply foliar Fe sprays in-season or to apply manure for long-term correction. If iron chlorosis has been observed during previous years in a field, iron fertilizer materials may be applied preemptively to the foliage through multiple sprayings early in the season. Table 1 gives suggested foliar treatments to correct iron as well as zinc deficiencies.

Wheat Seed Availability for Fall 2013

No surprise, wheat seed supply will be very short and/or very expensive. You may have heard that much of the Kansas wheat crop—about the eastern half of the state—busted the bins on yield for thousands of farmers. But the western half of Kansas had reduced yields, and the seedblocks for many of the wheat varieties that we are so short on for the Texas High Plains are most likely grown in western Kansas. So if wheat of a particular variety is in fact available, trucking is going to drive the prices up. And much of the wheat that is available has small seed which needs to be tested for germination, and if it is indeed satisfactory, then it can't be planted as deep due to weak push and emergence (though you may be able to reduce the seeding rate).

Beardless wheat: Expect an especially acute shortage of beardless wheat. Most that is grown for seed in the Texas High Plains as especially Kansas and to some extent Oklahoma don't use it nearly as much. So there will not be the supplies to haul in even if you were willing to pay the cost. And the beardless wheat in the Texas High Plains that did make it to harvest was very poor yielding. Call for seed supplies now. Dairies use a lot of beardless wheat for silage so the demand will be there. Wheat planted for hay and silage should use a grain seeding date (early October in the northwest South Plains; late October in the lower South Plains) where even seeding rates as low at 30 lbs./A (normal size seed) can still produce very good yields. This is in contrast to grazing where higher seeding rates are needed to drive forage growth, especially for fall grazing. CT

Fig. 1A) Iron deficiency in chalky soil where some leaves are almost completely bleached out and others show the striping of interveinal chlorosis (Fluid Fertilizer Foundation)

Fig. 1B) Iron deficiency in older plants exacerbated by wet soil

Table 1. Suggested sources, rates, and timing of iron foliar sprays.

Deficiency	Product*	Product/100 gals water	Product/ Acre	Timing
Iron	Iron sulfate (20% Fe)	20 lbs (2.5% solution)	1 lb. then 2-3 lbs.	10-14 days after emergence - 5 gals/A over crop row. Follow with additional applications @ 10-14 day intervals @ 10-15 gals/A
	Iron chelate (10% Fe)	8 lbs. (1%)	0.4-0.5 lbs	Same as above

*Include a surfactant or other wetting agent. Product composition may vary. Select similar products or adjust mixing ratios to achieve comparable rates of nutrient application.

Source: Updated information based on research results and recommendations through the Texas AgriLife Extension Service Soil, Water and Forage Testing Laboratory.

For further information about iron consult 'Correcting Iron Deficiencies in Grain Sorghum' L-5155, from Texas AgriLife Extension (http://agrilifebookstore.org, or contact your local county Extension office). 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