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FOCUS on South Plains Agriculture

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

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In spite of a rough start for cotton this year, cotton has made good progress and hopefully with the given warm temperature forecast, cotton will be entering into bloom pretty soon. No doubt that our crop is behind the expected, "normal" growth and development curve, but with all the moisture and warm weather we should expect to see a good crop with average to above average yield. The most talked about issue around the cotton community now is the "weed control". Glyphosate resistant pigweeds are reported in large number of the fields across the High Plains and producers are using both mechanical and chemical control methods to manage the weed situation on their farms. Fortunately, on the insect side, the insect pest pressure on our cotton seems to be low and exists only in certain pockets. The area cotton is at various growth stages, but mostly at squaring stage. There are few insect pest species, which could be injurious to cotton at this stage.

Cotton fleahoppers are the primary pest during the squaring cotton. They feed on pin-head size cotton squares by inserting their needle-like mouthparts and as a result the squares dry-out and eventually drop off. Since cotton at early squaring stage has squares only on the main stem (first position), fleahopper infestation could lead to the loss of these valuable squares and significantly impact yield (Fig. 1). However, once cotton is past blooming stage, squares on the main stem are large enough for fleahoppers to cause any injury. So far, there are several locations in the High Plains where cotton fields have been treated for fleahoppers. Typically, when you see cotton fleahoppers in your field (25-30 per 100 terminals) and associated loss of pin-head size squares (less than 75% square retention on third week of squaring), it is time to make application for fleahoppers. Insecticides that can be used to control fleahoppers include but are not limited to Orthene® 97 @ 8 oz/acre, Bidrin® 1.6-3.2 oz/acre, Intruder® WSP @ 0.6 oz/acre, Transform® WG 0.75 oz/acre, and Carbine™ 50WG @ 1.7 oz/acre.

Besides cotton fleahoppers, low numbers of cotton aphids have been observed in several fields. Cotton aphids can be a pest at any growth stage of cotton provided their number is high enough. Typically, low number of aphids in our cotton is not a big concern as long as there are beneficial insects such as lady beetles, lacewings and scymnus beetles present. However, it is important to keep an eye on the aphid populations as they can grow quickly in absence of the beneficial insects, particularly in situation where a previous insecticide application knocked down the beneficial insects.

I was informed that there are few non-Bt cotton fields affected by saltmarsh caterpillars and beet armyworms, not to an extent to warrant insecticide applications. Beet armyworms can invade our cotton even before cotton starts blooming. Since they are

primarily a foliage feeder, the first symptom of beet armyworm invasion is evident on the leaves. The small larvae/caterpillars feed on the underside of the leaves in groups and results in window-pane like appearance of leaves, which is called a beet armyworm "hit" (Fig. 2). Cotton fields with unmanaged weeds, mainly pigweed, are the most likely candidate for beet armyworm invasion. Similarly, saltmarsh caterpillars are also leaf feeders and can completely devour cotton plants. Since we had some good rain early in the growing season, there is a good chance that high number of saltmarsh caterpillars will be available in vegetation such as CRP land etc. So, be watchful for this and any other caterpillars in your cotton fields, especially if you have non-Bt acres. Please do not hesitate to reach me at Apurba.Barman@ag.tamu.edu or 806-407-2830 (cell) regarding any cotton insect related questions. **AB**

Figure 1. Loss of first position, pinhead size square from a cotton plant

Figure 2. Beet armyworm feeding on leaves or "hit"

Cotton Agronomy

Texas High Plains and Panhandle Cotton Crop Update

Cotton across the region has begun to come around and resume growth and development following the much-needed and timely precipitation events. Although I have heard a few grumblings of the results of the rain, and have mumbled a few myself, I have yet to hear anyone outright "complain" about the rain! I have seen fields with cotton that is, at best, 10 days to 2 weeks behind and at worst, 3-4 weeks behind. This situation (developmental delay) is similar to what was observed in '13. With this delay in growth comes the need to protect early fruit set by reducing competition from weeds (or volunteer cotton) and close monitoring and aggressive management of insects that can damage small squares resulting in fruit shed.

High weed populations compete with already struggling cotton for moisture and nutrients and may result in square shed. I have received calls from producers that were concerned about the progress, or lack thereof, of their cotton crop. Most were asking what, if anything, could be applied to the struggling crop to increase growth and development. Based upon past research by myself and Dr. Randy Boman, as well as from comments and articles of colleagues across the cotton belt, no product has been identified that will increase growth and/or development, and subsequently increase yield potential, when applied to cotton that is struggling. As we have seen for many of these fields the past few days, temperatures in the upper 80's and lower to mid 90's, open skies, and light winds are what is needed to get the "sickly" cotton crop or **"poor-doin' plants" (original quote from Tommy Doederlein Texas A&M AgriLife Extension IPM Agent – Dawson and Lynn Counties)** going again. Typically, cotton will bloom at 35-40 days after planting with heat unit (HU) accumulations around 950 (varies by variety and environment). Based on the Cotton Heat Units website (www.cottonheatunits.com), a total of 993 heat units have accumulated from 5-May in the Lubbock area. This is 30 HU's above the long term average of 963 for Lubbock. One bright spot has been the low early-season insect pressure which has been observed. As was mentioned above, due to the developmental delay, it is **highly important** for producers to maintain as much of the current fruit set as possible by being vigilant with weed and insect control. An open fall is not a guarantee in the Texas High Plains and an early cool snap could result in low yields and low quality from late fruit set.

Plant growth regulators

Questions concerning mepiquat-based (Pix, Pix Plus, Mepex, Mepichlor, Mepiquat Chloride, Mepex GinOut, Stance, and others) plant growth regulators (PGRs) are being asked. 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 "excellent" 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 replicated testing indicates that from 5 to 20% reduction in plant height (compared to the control) were observed 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 high 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 these products when comes to growth control. 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. Pentia is a formulation of mepiquat pentaborate - a different molecular structure than MC. Nufarm's Mepex Gin Out product contains the same amount of MC active ingredient as others, but contains an additional PGR. Refer to the product labels or contact local representatives to ensure you understand the correct use of these products.

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

Pentia
Mepiquat pentaborate molecule (different from MC)
9.6% a.i./gallon or 0.82 lb a.i./gallon

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 that 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 early-season 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 varieties with vigorous growth potential and have fields with excellent growing conditions need to be concerned. 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 cotton 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. Picker harvesters can handle higher yielding, taller plants with much greater ease than stripper harvesters, especially when the stalks are still alive (or "green"). However, if weather constraints at harvest time delay harvesting after freezing weather, the large brittle plants can still result in picker harvesting difficulties. Determination of application rates is generally more "art" than "science" for these products. Applications should begin when 50% of the plants have one or more match-head squares (see specific product label for more information). 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 in 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 high growth potential varieties and fruit retention. If a high growth potential 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 newer 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. Sequential applications can be adjusted to meet subsequent crop conditions and growth potential.

Nitrogen fertility

With cotton squaring, some producers may be in the process of, or planning to apply fertilizer to their crops. With this in mind, I have included an excerpt from the June 18, 2010 FOCUS on South Plains Agriculture Newsletter authored by Dr. Randy Boman.

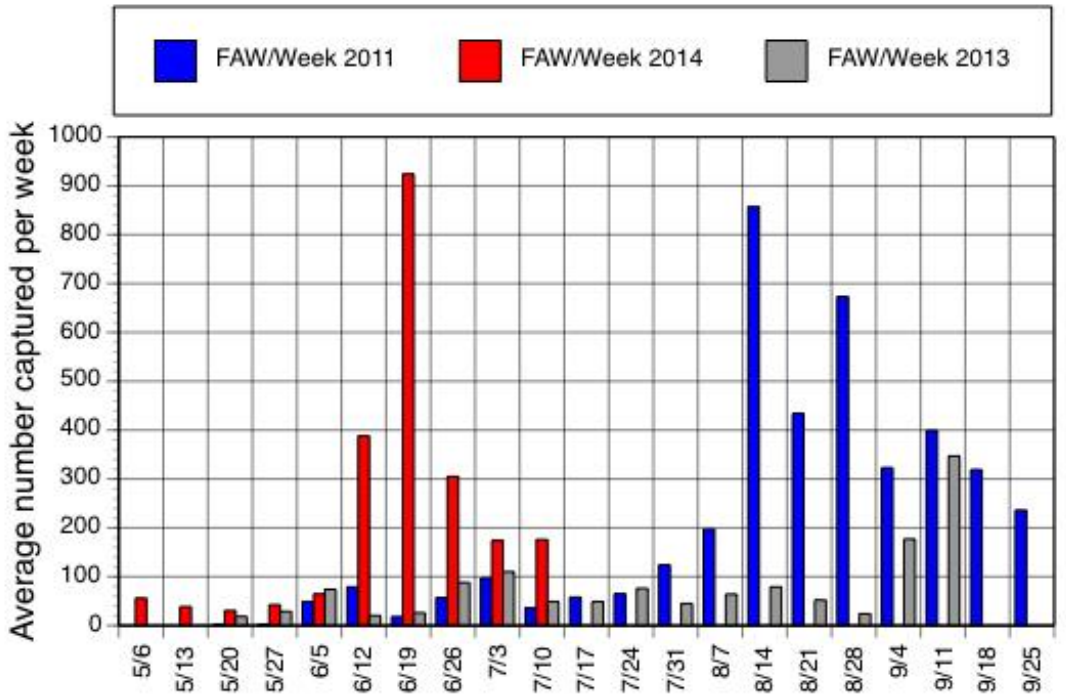
“A one-bale per acre cotton crop will remove about 45 lb of actual N per acre, but due to inefficiencies in uptake and in the soil, about 50 lb N/acre are actually required. Our current recommendations in the Texas High Plains are to apply 50 lb N per bale of yield goal. It is important to not over fertilize with N if reduced yield potential is anticipated. This is due to the fact that it makes late cotton more difficult to manage on the back side of the season and may complicate harvest aid performance. Some late-season insect problems, such as aphids, can be aggravated by high N status plants, and incidence of Verticillium wilt may be increased. There is good evidence that excessive N in general can also result in delayed maturity with corresponding decreases in maturity of the fiber (micronaire). I seriously doubt that any high yielding drip irrigated field really needs more than about 150 lbs N/acre for yields up to four bales/acre. Assess the yield potential of your specific fields and make N fertilization adjustments accordingly. Much of the dryland is in good to excellent condition. Apply side-dress fertilizers as early as practical (but before bloom), and take care to minimize root pruning during application. It takes about 10 lb of N to produce 100 lb of lint. If the yield potential is reduced by one-fourth to one-half of a bale per acre due to late planting or lagging development, then also reduce the actual N rate by 15 to 25 lb per acre. A good rule of thumb is to apply 30 to 50 pounds of actual nitrogen to dryland fields that are emerged and have good soil moisture. Benefits from low rates of foliar fertilizers are questionable. A knifing rig fitted with coulters would be a good way to accomplish N fertilization. Apply the fertilizer to the side of the bed for low elevation spray (LESA) fields and place coulters to the side of the bed into the "wet furrows" for low energy precision application (LEPA) systems. For alternate-furrow subsurface drip irrigated fields, place the coulters to the side of the bed in the furrow with the drip tape, being extremely careful not to damage the tape. Since most drip tape has been placed 10-14 inches or so deep, placement of N fertilizer 4-5 inches deep should suffice. Many producers may be tempted to cut fertilizer use by a certain percent or to use a gallon per acre of this or gallon per acre of that to replace a sound fertilizer program. The cotton plant has a physiological need for nutrients. These nutrients have to come from somewhere if good to excellent yields are to be expected. If one does the math concerning what some of the "gallon per acre" products can supply, then it is fairly easy to determine that these products will not meet the needs of the crop. And they could be very expensive when comparing the "program price" with how many pounds of N the same money could buy using conventional fertilizers. If good to excellent yields are obtained after cutting back on a recommended fertilizer management program, then the producer is actually "writing checks on the checking account" in the soil. If no deposits are made over time, then a shortage of fertility will occur and yields will be adversely affected. Soil sampling and testing was discussed during the winter Extension meetings, and I hope that our producers who are cutting back on fertilizer use have solid justification to do so (a soil test report that indicates that there is considerable fertility in the "checking account"). The amount of organic residue of the previous crop is also important and will potentially adversely affect nitrogen availability. If the previous crop was grain sorghum or if cotton was planted into terminated small grains cover then producers should consider increasing nitrogen fertilizer rates by around 20-30 pounds per acre in order to have adequate nitrogen for the cotton crop due to microbial immobilization of crop residue. Fertigation of UAN (32-0-0) is a practical application method in the High Plains, especially in center pivot and subsurface drip irrigated fields. This results in lower application cost. One should consider whether a LEPA system with drop hoses is used vs. a spray system. If a pivot rigged with spray nozzles has marginal water quality and extremely hot, dry conditions are encountered, then some salt burn may be encountered on foliage. To obtain maximum utilization of applied N, the total amount of N should probably be injected between first square and peak bloom. This type of N management fertigation scenario has been used and validated for the last several years at the Lamesa AG-CARES facility and Halfway Helms Farm using alternate furrow LEPA irrigation.”

Several N related publications are available on the Lubbock website at http://lubbock.tamu.edu/programs/crops/cotton/fertility/. 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. **MK**

Corn and Sorghum Insects

Fall Armyworm Captures

2014 fall armyworm pheromone trap captures (moths per week) at Lubbock.
2011 was a high fall armyworm year.



It is watch and wait time now as corn and sorghum grow and we still don't know enough about the trends in pest populations.

Fall armyworm numbers started climbing back up today and there were many fresh moths in the traps; this is the front end of the next flight. The big question is how many more larvae, progeny of the big flight in the graph above, survived and are now in the pupal stage. If survivorship was significant then we can expect an increase in trap counts for the next couple of weeks. The fall armyworm damage to my non-Bt corn at Lubbock is impressive, and I have heard of non-Bt fields as far away as Dalhart needing to be treated. Corn earworm traps counts are not particularly high in the region. I am not running corn earworm pheromone traps, but now I wish I was. This is because my silking (green silk to brown silk) corn at Lubbock has 20 – 35 eggs per ear on the silks. This won't be a big problem for yield, in part because corn earworms are cannibalistic, which will eventually decrease the number per ear to one or two. However, fall armyworm and corn earworm can coexist in ears and I am waiting to see how large the next fall armyworm flight is before I breathe a little easier.

Blayne Reed, IPM Agent in Hale and Swisher counties, is reporting normal numbers of corn earworms in his traps. Gary Cross, Extension Agent Ag in Hale County, is reporting relatively low fall armyworm numbers in his traps this week.

Spider mites are present in some fields of corn and sorghum and will be worth watching, especially as we approach tassel stage in corn. This week Blayne Reed reported three fields with rapidly increasing mite numbers. The wet weather set the mites back a bit, but it also really set back the biological control agents that often keep spider mites in check, and Blayne is finding very few beneficials.

This might be a heavier than normal sorghum midge year, in part because the Johnsongrass is doing very well as a result of the recent rainfall. Johnsongrass is an early season host of midge, and populations can build up early in the year and then move to flowering sorghum. It is still too early to tell what midge numbers will be like, but they have an initial advantage and blooming sorghum should be scouted.

One bit of positive news is that we have not found the white sugarcane aphid on either sorghum or Johnsongrass yet. Word came Tuesday this week that the aphid has made a very big comeback on the coast and growers are trying to harvest before things get worse. We will keep watching for the pest and would encourage anyone with unusual aphid problems in sorghum to give us a call. My phone number is (806) 746-6101. Ed Bynum, Extension Entomologist in Amarillo, can be reached at (806) 677-5600.

Mozena obtusa, Round Two

Mozena obtusa nymph. Photo Credit: Caitlin Jackson.

Caitlin Jackson, Extension Agent Ag in Crosby County, had reports of large numbers of bugs infesting a property. These turned out to be the nymphs (immature stages) of Mozena obtusa, the insect we discussed in the last two editions of FOCUS. They are primarily mesquite feeders and not a matter of concern. Here is what the nymphs look like.

Checkered melon beetle appears in large numbers

The scientific name is *Paranapiacaba tricincta,* but checkered melon beetle is much easier to pronounce. These insects are easy to find in corn right now and Blayne Reed is finding them "in very high numbers" in pretassel corn in Swisher county. They are also in my Lubbock corn. These insects mostly feed on plants in the gourd family and are often found on wild gourd and squash blossoms. **RPP**

Checkered melon beetle. Photo Credit: Patrick Porter

Small Grains Agronomy

Status of Younger Grain Sorghum—Purple, Yellow, Stunted, Survival…

Numerous questions have arisen on later planted grain sorghum (June and later) about poor growth and stagnation. There are several questions including:

- What causes the purple color?
- Is the yellowing iron (Fe) deficiency or something more?
- Is Atrazine or Dual (s-metolochlor) to blame for poor sorghum growth?
- Why is the sorghum so stunted and why is there little rooting?
- Some sorghum appears to be dying.
- If my sorghum is struggling, should I replant, applier foliar nutrient treatments, or wait it out?

Let's break this down in to the above components and discuss these one at a time. I share considerable comments from Drs. Wayne Keeling & Peter Dotray, our weed science staff at Texas A&M AgriLife, Lubbock, as well as from former Amarillo AgriLife extension agronomist Dr. Brent Bean.

Grain sorghum historically, even in otherwise normal conditions, and in the absence of any herbicide issues, struggles with "wet feet," e.g., when conditions are wet for prolonged periods (lots of rain, poor internal soil drainage, etc.) then the uptake of iron is limited (the oxidized Fe^{3+} form is insoluble) and plants will express the classical iron deficiency symptoms whereby leaf veins are green and the area between veins is yellow. In some cases the deficiency is so severe that the leaves are bleached out almost white and the green/yellow veination disappears. **This is the dominant historical condition in West Texas when stunted, yellow grain sorghum occurs** apart from planting on caliche soils. High pH soils and especially caliche contribute to iron chlorosis and stunting in grain sorghum apart from any water-logged condition, herbicide injury, etc. (and this is less in corn than in grain sorghum).

Purple Discoloration

Many current young sorghum plants are lightly to strongly purple in color. This occasional condition was discussed in the June 7, 2013 FOCUS, http://lubbock.tamu.edu/files/2013/06/June_7_3013.pdf Purpling can come from cool conditions (and wet conditions can contribute) and possibly Dual type herbicides (chloroacetamide), but the discoloration is usually temporary and sorghum quickly grows out of it. The pigmentation that causes the purpling does not necessarily mean the plant is unhealthy though we do see extreme cases where we associate the purple with dying plants when it fact this potential plant death is due to other factors. The purpling you see is generally not due to P deficiency as you can find this condition in field that test 'medium' or higher on soil test P or have been fertilized with 10-34-0, etc.

Is the yellowing from only iron (Fe) deficiency or something more?
As noted above, prolonged wet conditions often cause iron deficiency symptoms in grain sorghum. This is normally temporary, and moderate cases usually don't affect yield. In severe cases stunting occurs and yield can be reduced substantially, but these situations are much more likely where the field itself, high pH and/or caliche—apart from any potential herbicide issue—is already susceptible to iron deficiency. Many and most of the cases that farmers typically encounter in West Texas eventually grow out of the deficiency and those that have applied iron (ferrous sulfate or chelated forms) really don't know if any early applications ever really made a difference other than aesthetic appearance. You may be able to green the crop back up quicker, but did it impact yield? This is often doubtful.

Iron applications for correcting deficiency. The fertility chapter of United Sorghum Checkoff Program's 'West Texas Sorghum Production Guide' (pocket guide is available through http://sorghum.mobi or online at www.sorghumcheckoff.com (choose 'For Farmers' then 'Production Tools'). This briefly outlines iron deficiency in grain sorghum and general guidelines for corrective measures.

An additional old 1996 A&M extension guide "Correcting Iron Deficiencies in Grain Sorghum," L-5155 (available through http://agrilifebookstore.org) discusses iron deficiency in grain sorghum in more detail, but neither resource truly offers much guidance in what your threshold should be for initiating iron corrective measures. I have seen deficiencies on grain sorghum and peanuts, and after a couple of foliar sprays one may not be convinced that it ever made a difference (in contrast to drying conditions, expansion of roots, etc.). The latter document notes that if iron deficiency is an issue that spot treatments should be able to demonstrate improvement in plant coloration in 4 to 7 days. Iron in plants is immobile, and this is how it is often distinguished from nitrogen deficiency, as N is mobile in the plant. Thus with iron deficiency as conditions that alleviate the Fe deficiency are overcome newly emerging leaves will return to green. Older leaves that were deficient will not green up unless they are sprayed with an iron source.

Both small plants and yellowing and purpling are seen in moderation in small plants (Fig.1), which I fully expect to recover and grow without need for iron chelate as long as soil aeration is good.

Figure 1. Stunted but growing gain sorghum seedlings with yellowing/chlorosis and purpling, but plants are actively growing. The roots of the same plants had at least two actively growing secondary roots. These plants are at leaf stage 3 (third leaf is fully expanded and the collar has formed). The next leaf or two to emerge should be green.

Figure 2. Each seedling though stunted has at least one new root emerging from the base of the crown. This is especially important for the middle plant which has relied completely on the initial radicle for growth.

Figure 3. Continuum of sorghum seedlings from the same field (Armstrong Co.). Assessment should include new rooting and newly emerging leaves that are returning to green. Seedlings 2 and 4 (L to R) have healthier emerging leaves.

Figure 4. Severe injury that appears to be more than 'wet feet' iron deficiency, cause unknown. This plant at leaf stage 7 is not expected to recover.

Is Atrazine or Dual to blame for poor sorghum growth?

Atrazine and Dual (*s*-metolochlor) are both currently being cited by many as a suspect in current poor grain sorghum growth. *Current and former AgriLife weed scientists note that it is not likely that either of these herbicides are the cause of most of the general symptoms being observed in regional fields.* Atrazine injury can produce stunting and yellowing in grain sorghum, and those symptoms may mimic straight iron deficiency both in yellowing and some interveinal chlorosis (striping) on the leaves. But how often does atrazine injury actually occur? Dr. Keeling notes that atrazine rates used to be higher than they are now (with no particular injury concerns), and 2014 herbicide work by Dr. Bean has noted his current tests, with the same rains that most all regional farmers experienced, has ATZ injury only at 3X rates and on sorghum that was just emerging (which is earlier than ATZ labels call for application). This represents an earlier planting when cool soils and pronounced wet conditions may have made grain sorghum more susceptible to injury. Furthermore, atrazine injury is expected to be rare on medium- and fine-textured soils as application rarely exceed 1 quart per acre.

Propazine (Milo-Pro) is not as strong as atrazine and AgriLife weed scientists expect essentially no practical potential for injury from this herbicide.

Some have suggested that much of the stunting or lack of rooting may be Dual damage in part because of a failure of the Concep seed safener (or other generic safener), but Dr. Keeling notes that this is not normally a concern or a reason that has been documented. Concep doesn't wash off the seed. Once sorghum is emerged there is little reason to believe that Dual will cause any injury. Furthermore, damage from Dual is likely when Concep is absent from the seed, which leads to "buggy whipping," which might also be from other possible chemical applications.

Why is the sorghum so stunted and why is there little rooting?

Some stunting is directly related to poorer or slow growing conditions. And as noted above, atrazine injury might lead to stunting of grain sorghum, but we are accustomed to grain sorghum growing out of this in time. The lack of rooting (only the primary radicle, the first root, exists, and there is little development of secondary roots from the base of the crown) or black secondary roots seen in several pictures from regional fields is perhaps of greater concern. Is this atrazine or s-metolochlor damage? Drs. Bean and Keeling believe it is not likely, and are unsure why we seem to have more reports of limited root growth in 2014. Neither herbicide normally acts in this fashion—limiting root growth—though many residual herbicides in rotation could have this effect.

Though rooting may be minimal, the primary root (radicle) can sustain a sorghum seedling to about leaf stage 3, and at that point we need to see additional roots emerging from the crown (Fig. 2) in order to expect seedling survival.

Does atrazine or Dual wash down into the root zone? Dr. Bean notes that these herbicides are not expected to move much, and in fact if they are moved downward by a large rain, this will serve to dilute the chemical. Dual injury, if it occurs, would likely be very early before emergence when *s*-metolochlor can be taken up by the coleoptile.

The literature also suggests that species of Fusarium fungus may blacken and cannibalize root tissue, especially if growth is slow. I am not aware of this being documented in West Texas.

Some Sorghum Appears to be Dying or is Dead

Some pictures I have received do demonstrate that grain sorghum fields may have many individual plants that are dying (Figures 3 & 4). Some sorghum has been replanted already based on actual low remaining plant population. Also, Dr. Dotray notes that Concep III (lack of) does not cause the symptoms we are currently observing in his long-term annual herbicide symptomology demonstrations. Dr. Keeling adds that Dual injury is often expressed as a "buggy whipping" of upper leaves (leaves wrapped together, all coming to a point in a whip-like fashion).

Dr. Dotray also notes reports as recently July 7 that sorghum is greening up in some fields, which regardless what the potential single or multiple causes might be on an individual field we would expect this greening to occur on many fields as soils dry and root volume expands. One report to Dr. Dotray already noted that foliar feed has already helped green up a crop (we won't know about yield for a couple of months). If you decide to apply iron chelate or some other foliage application be sure to leave an untreated area for comparison. Otherwise you remain fully bound to subjective comparisons.

Sorghum Symptomology for Herbicides vs. Untreated, 2014 Lubbock Plots—No Differences

Both Keeling and Dotray point to their 2014 plots at Lubbock where on July 8 Dr. Dotray relayed they both continue to see no differences in symptoms in non-treated plots where no Dual, no atrazine, no propazine has been applied. Furthermore, this involves three planting dates which minimizes the possibility that one treatment might have caught heavy rain at a particular time and led to symptoms under certain circumstances. All of these plots have received as much or more rain (7-11") than just about any sorghum in the region. The yellowing and other symptomology is uniform across the plots. As Dr. Dotray noted, he fully expects these plots will look much better in 2-3 weeks with warm weather and drying.

If my sorghum is struggling, should I replant, applier foliar nutrient treatments, or wait it out?

A producer worry is that if he or she already has a problem with existing grain sorghum then re-planting may not change anything—the same symptoms that caused the first poor sorghum growth may still exist. If there is indeed any herbicide issue it would likely be less. If this is a matter of 'wet feet' then no, we don't expect to go through the same high level of rain we have had since Memorial Day weekend and temperature are warmer now. But time is essentially out on replanting grain sorghum in the Northwest South Plains and the Panhandle counties except the southeast Panhandle. Central South Plains counties have an Extension last recommended planting date of July 10 for early maturity hybrids (though some would prefer to take the little added risk by planting a medium-early a few days extra later in the season); Gaines, Lynn, Garza, Dawson, add an extra five days on last recommend planting date for grain sorghum.

If you have a field that is severely stunted and looks questionable, here are three criteria for keeping the field 'as is':

1) The current leaf emerging from the whorl is better than other leaves on the plant, e.g., it has at least some green in it. If this leaf is brown or dead, the plant is finished (growing point dead).
2) You see evidence of new roots emerging/growing from the base of the crown (like in Fig. 2), especially if there are currently few or no secondary roots. This suggests the plant has turned the corner and it can recover.
3) You have a sufficient population of plants in the field to achieve acceptable grain yield potential. This could be as little as 13,000 plants per acre on dryland, especially if spacing is somewhat uniform (1 plant per foot of row on 40" rows).

Foliar treatments, especially iron (most likely in the chelated form) are commonly applied to grain sorghum for iron deficiency. This has demonstrated benefits in many instances for greening the crop ("now I feel better") and sometimes ultimately yield (much less certain when moderate iron deficiency exists). The great majority of cases iron is the issue, thus it is not likely foliar N or other micronutrients or growth regulators will further improve crop response and recovery. If you decide to pursue iron on the sorghum then return to the section above for guidelines.

Sorghum Field Injury Assessment Form

To assist Texas A&M AgriLife in collecting field-specific conditions for poor grain sorghum, see the form "Sorghum Field Injury Assessment Form 2014," posted at http://lubbock.tamu.edu/programs/crops/sorghum/ It asks questions relevant for assessing these potential issues in grain sorghum. Along with any pictures you may have, instructions are in the form to submit them to AgriLife for review.

Is Huskie Herbicide Residual from Grain Sorghum a Concern to Rotation Cotton?

In the May 30 edition of FOCUS we briefly noted that for the first time AgriLife weed scientists had noted some residual carryover from 2012 Huskie to cotton (http://lubbock.tamu.edu/files/2014/05/FOCUS-May-30.pdf). Since then several producers have responded that their chemical dealer/farm supplier has recommended they not use Huskie in grain sorghum. Dr. Pete Dotray has elaborated on this concern.

Within Texas A&M AgriLife's three High Plains weed scientists (Keeling & Dotray, Lubbock; formerly Bean, Amarillo), only in 2013 have they observed any issue—slight to moderate—with rotation to cotton and peanuts after Huskie since initiating work in 2009. Dr. Dotray notes the situations he is aware of where reduced stands were suspected were very dry soils with little rainfall (or irrigation). Furthermore these A&M tests likely included Huskie applied with atrazine (ATZ) and thus it is difficult to discriminate whether the reduced growth in AgriLife tests (or purported injury you might hear about from others) is due to Huskie or ATZ. Dr. Dotray

has one trial site this year that had two Huskie applications in 2013 (the first with ATZ), and the cotton stand is very good.

Now that we are into July many producers would shy away from applying even 1 pint of ATZ with the Huskie per rotation to cotton in 2015. This is fine; do NOT substitute propazine as it seems to antagonize Huskie per Dr. Dotray's comments. But if weeds are small, then Huskie by itself can still be highly effective especially if you follow the guidelines to include AMS and with either NIS or HSOC. Huskie use is favorable relative to 2,4-D and dicamba as 1) Huskie has a lower injury potential in grain sorghum (burn, which it grows out of; Bayer recommends inclusion of iron chelate which lessens the injury), and 2) Huskie does not have volatilization drift issues like 2,4-D or dicamba. Both of these materials are actually listed in the Huskie label as tank mix partners, however, there are some other options for potentially more broad-spectrum weed control if desired (be sure to cross check applicability to sorghum and the potential rotation back to cotton).

For further information about Huskie use in grain sorghum consult the Texas A&M AgriLife link at http://lubbock.tamu.edu/files/2014/03/Huskie-Grain-Sorghum-Summ-Mar2014-Trostle-PDF.pdf

Sunflower Head Moth Control—Timing/Carrier Volume/Coverage vs. Choice of Chemical

Sunflower growers in the Texas High Plains have long known that essential control decisions regarding this pest—timely scouting, pre-arrangements for spraying, spray timing that emphasizes early spraying vs. late relative to bloom, choice of chemical, follow-up scouting after treatment—go a long way toward successful sunflower farming. Over many years the most common explanation to sunflower head moth damage in the head is likely "the field was sprayed too late."

Furthermore, good coverage is an important key to effective sunflower head moth control. AgriLife Extension notes that many chemicals used in aerial application to sunflower permit as little as 2 gallons of carrier volume per acre. Even though this is labeled AgriLife disagrees with this guideline, and we believe that sunflower growers should retain at least 3 gallons carrier volume per acre (including Dupont's 'Prevathon', discussed below, where even Dupont staff disagree with their own labeled 2-gallon carrier volume).

For a comprehensive guide to control of sunflower head moth and other insects in sunflower, consult Amarillo Extension entomologist Dr. Ed Bynum's "Managing Insect Pests of Texas Sunflower (2009)" at http://lubbock.tamu.edu/files/2011/11/Sunflower_Pests_E_579.pdf

Since this publication was issued several new insecticides have come to market for head moth and other potential pests of sunflower, including Prevathon, Besiege, and Belt. For an updated summary on sunflower head moth control and basic information about these new insecticides, consult the 2014 Bynum/Trostle PowerPoint 'Texas Sunflower Insects Summary June 2014' at http://lubbock.tamu.edu/programs/crops/sunflowers/

This updated summary includes some basic discussion of these newer insecticides and explains the active ingredient rynaxypyr in Prevathon and Besiege (the latter pairs rynaxypyr with a pyrethroid), which kills feeding larvae rather than the adult moth. Company suggestions recommend early application of rynaxypyr at initial bloom and even earlier though AgriLife has not sufficiently tested the timing of initial sprays for Prevathon or Besiege. CT

Mistakes on Tank Additives for Beyond Herbicide Applications in Clearfield/Clearfield Plus Sunflower

Clearfield sunflowers (imi-tolerant) are coupled with Beyond herbicide (a.i. imazamox) for POST weed control. Clearfield has become popular among oilseed sunflowers and several confectionary hybrids are now also Clearfield. Beginning with the 2013 cropping season some sunflowers are now labeled as Clearfield Plus. Though the rate of Beyond herbicide and its application timing did not change with the introduction of Clearfield Plus, the latter recommends use of hotter COC or MSO in lieu of NIS. Expressed differently, the Beyond label specifically states do not use COC or MSO on Clearfield only sunflower.

Two growers in the northern South Plains have recently lost fields of Clearfield sunflowers (not Clearfield Plus) because they used either COC or MSO—intended for Clearfield Plus only—rather than NIS.

The possible source of this confusion is that several companies have improved hybrids that retained the same hybrid number from when they were non-Clearfield hybrids, and now newer versions of these hybrids are even labeled as Clearfield Plus. Two common examples are large-seeded Red River 2217CP, first marketed as a conventional hybrid and is now Clearfield Plus, and Mycogen's 8H449DM which is now 8H449CLDM.

Just remember that Clearfield and Clearfield Plus sunflowers are not the same when spraying with Beyond herbicide and they are treated differently.

Sunflowers and Wild Hogs—Good News

During my recent tour of state sunflower production areas growers in Hill and Ellis Counties south of Dallas and Lamar and Fannin Counties northeast of Dallas report that wild hogs have not caused damage in their sunflowers. Growers note evidence that hogs have been in the fields, but the hogs seem to leave the 'flowers alone. This may be a plus for some growers depending on where your fields are. If you have any observations or have experienced hog damage in sunflower please let Calvin Trostle know. **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