Cotton Comments

OSU Southwest Oklahoma Research and Extension Center
Altus, OK

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Current Situation

Over the last several weeks, the drought situation has improved in many areas of the state. However, based on the March 12 U.S. Drought Monitor, Extreme and Exceptional drought continues to paint much of western Oklahoma. These two categories currently represent about 56.7% of the state. Most of the far southwestern corner of the state is classified in the Exceptional Drought Category. Many producers are rightfully concerned about the possibility of heading into a third summer of disastrous drought. Cotton prices have recently risen and there is optimism concerning that overall situation. The next several weeks will determine whether we have the potential for a good start. Lake Lugert is currently at 16.5% of capacity, which does not bode well for the Lugert-Altus Irrigation District's cotton production chances.

Deep Sampling

Nitrogen (N) is typically one of the most expensive fertilizer nutrients used in cotton production. It can also be difficult to properly manage because of biological activity and mobility in the soil environment. Inadequate N reduces the number of fruiting sites and potential yield, whereas excessive N can create rank growth, and can actually lower yield and quality by delaying maturity. Excess N can also potentially increase problems with disease, insects, and defoliation. Recommended N rates are based on the N required to produce a crop at a realistic yield goal, and should be reduced by credits for residual nitrate nitrogen (NO_3-N) in the soil, as well as by any NO_3-N applied in irrigation water. Crediting soil and water NO_3-N requires collection and submission of samples to a laboratory for proper analysis. In 2012, OSU N recommendations for cotton were changed from 60 lb N/bale of yield goal to 50 lb N/bale. A factsheet was generated to support this and it can be found by clicking here. (Click here for PSS2158).

Deep soil sampling for residual N can be accomplished using a hydraulic probe. In Oklahoma, deep sampling to a depth of 18 inches is suggested and supported with recommendations by the Soil, Water & Forage Quality Analytical Laboratory. In order to accomplish this, a probe must be inserted 18" into the soil, and the resultant core should be sectioned into 0-6 inch (submit for routine analysis) and 6-18 inch (submit for NO_3-N only) increments. We have a few producers who have adopted deep sampling as a management practice. Many times, these producers have constructed the frame and purchased the hydraulic pump system and soil probes and other accessories. Probes

have been mounted on utility vehicles such as a John Deere Gator or Ranger Polaris. Pickup trucks or small tractors can also be utilized. If anyone has any questions concerning this, please give me a call at the Southwest Research and Extension Center.

Based on deep sampling results from the Altus and Tipton research farms, the amount of N accumulating has increased after each of the last two failed cotton crops. It should be noted that good to excellent stands were obtained in both years at both sites. It is evident that N mineralization in the soil profile has contributed to the amount of residual N found in the 0-18 inch depth. All cotton fields at the Altus and Tipton research farms failed in both 2011 and 2012 due to drought issues. For an example of the amount of NO_3-N accumulation at the OSU Research and Extension Center at Altus after the 2011 and 2012 crop years, see the table below.

Deep Sampling Results
OSU SWREC, Altus
Residual NO_3-N in 0-18" Sampled in January
Fertilized for crop production in 2011

Residual NO_3-N in lb/acre in 0-18 inches		
Field	January, 2012 (Residual after 2011)	January, 2013 (Residual after 2012)
Block A	132	198
Block C	141	248
Block D	151	250
Bargain City	116	--
North 40	168	339

Seasonal NO_3-N mineralization is occurring, as well as accumulation of added fertilizer in 2011. Cotton in LAID failed in both years, but we did obtain good stands in both years.

Seed and Technology Cost

Cost should not necessarily be the primary reason for selecting a variety, but it is important. The value of a high yielding cotton variety with biotech traits to ease management requirements across a large number of acres is a serious consideration. According to USDA-AMS Cotton Varieties Planted - 2012 Crop, the Abilene Classing Office indicated that producers planted about 100% of the acreage to Roundup Ready Flex varieties, and about 98% to Bollgard II or Widestrike Bt technologies. The Plains

Cotton Growers 2013 Seed Cost Comparison Worksheet can certainly be useful for planning purposes. Shawn Wade has updated the Microsoft Excel spreadsheet which can be used within your Web browser, or downloaded and saved to your computer. About 100 varieties of many types can be found in the spreadsheet. The user can select up to 10 varieties to simultaneously compare total seed and technology fee costs based on a specific seeding rate. The row spacing and seed per row-ft can be entered by the user. This then calculates a seed drop on a per acre basis. Then, based on published pricing for the various seed varieties and technology fees, the cost per acre is automatically calculated. It should be noted that the pricing used in the spreadsheet does not include premium seed treatments or any incentive program that might be provided by the various companies.

The Seed Cost Comparison Worksheet is available here:
www.plainscotton.org

Variety Selection Issues

Selecting productive cotton varieties is not an easy task, especially in Oklahoma where weather can literally "make or break" a crop. Producers need to do their homework by comparing several characteristics among many different varieties, and then keying these characteristics to typical growing conditions. We can't control our growing environment from year to year, but we can select the varieties we plant based on desired attributes. It is very important to select and plant varieties that fit specific fields on your operation. Don't plant the farm to a single variety, and try relatively small acreages of new ones before extensive planting.

Variety Testing Publications

If disease issues are not concerning, then scrutinize all possible university trial data that are available to see how a specific variety has performed across a series of environments, and if possible, across years. It is best to consider multi-year and multi-site performance averages when they are available. However, due to the rate of varietal release, many new varieties are sold which have not undergone multi-year university testing, or perhaps no university testing at all. Our 2012 variety testing program was drastically affected by drought and results are available here:
http://cotton.okstate.edu/variety-tests

When it comes to variety selection in Oklahoma, several factors are important to consider.

Maturity (Earliness)

Scrutinizing the relative maturity rankings provided by seed companies will be beneficial. Don't expect a mid-full season cotton variety to perform well in a short season environment where an early or early-mid might generally work best. Many longer season cotton varieties are better adapted to areas with longer growing seasons, although significant gains in yield may sometimes be obtained in years with warm September and October temperatures. Longer season varieties will typically do much better when planted earlier and then provided an excellent finish. For later plantings, early-mid maturity varieties may be better, and for late plantings or replant situations, early maturity varieties may be better. Relative maturity for most varieties gets compressed when moisture stress occurs. In other words, under drought stress, maturity of longer season varieties will not be expressed to the degree that would generally be noted when under high water and fertility regimes.

Pounds

Yield potential is probably the single most important agronomic characteristic, because pounds do drive profitability and provides for the safety net of higher actual production history (APH) in case of catastrophic loss of acres. The benefit this can provide from the crop insurance perspective is important in our high risk area. Yield stability across environments is going to be important, and basically what we want to find is a variety that has the ability to provide high yield across varying water inputs.

Fiber Quality

Producers should also consider lint quality. We have made a lot of progress in terms of fiber quality over the last several years. We have seen significant improvements in overall fiber quality packages associated with our modern varieties. Staple is generally good to excellent for most new varieties. A lot of things can affect crop micronaire. These factors can include overall environment, planting date, variety, early season fruit loss with later compensation, excessive late season irrigation or rainfall, seedling disease, early season set-backs due to hail damage, blowing sand, thrips, etc. Fiber strength has also significantly improved and many newer varieties tend to be at least 30 g/tex. Length uniformity can be affected by staple, maturity, and harvest method (picker harvested typically higher than stripper harvested). Higher maturity fiber generally results in better uniformity. Leaf grade can be affected by density of leaf hairs on specific varieties in some years. Generally, cool, wet fall conditions can lead to lower quality leaf grades for varieties which tend to be hairy. In drier harvesting environments these differences tend to diminish. Color grades are basically a function of weathering or exposure of the fiber on the plant to wet conditions. The highest quality that a cotton boll can have is on the day that it opens. After that, if conditions favor microbial growth (warm, wet conditions) or if an early freeze affects immature cotton, then color grade quality will likely be reduced. Bark contamination is generally also driven by significant

late season rainfall followed by a freeze. In some years this can't be easily managed if stripper harvested. Conversely, picker harvesting can significantly reduce or eliminate bark contamination.

Storm Resistance

Storm resistance is still a concern for growers in our area. Even though many producers have adopted less storm resistant cotton varieties over the last several years, and generally done well with those, the overall management system the producer adopts can be important. Under significant moisture stress on dryland, some newer varieties may provide an unacceptable level of storm resistance, especially if the field is "left to the freeze." Producers planning to execute a sound harvest aid program as soon as the crop is mature can probably grow some fields of less storm resistant cotton. However, having large acreages of varieties with low storm resistance might be a prescription for disaster if the right environmental conditions align at harvest. Do not plan to leave looser open-boll cottons in the field until a freeze conditions the plants for harvest. Unacceptable pre-harvest lint loss is likely to result. Higher storm resistance varieties are better adapted to our harvesting conditions and they are more likely to survive damaging weather prior to harvest without considerable seedcotton loss. Inquire about the storm resistance of any variety on your potential planting list. If you do choose a variety with low storm resistance, plan and budget ahead for a good harvest aid program that will let you achieve an early harvest. Good storm resistance data are now being provided by most companies and we evaluated all variety trials for this attribute in 2012. For those planning to harvest with spindle pickers, varieties with higher storm resistance may possibly result in reduced picker harvesting efficiency.

Disease and Nematode Resistance/Tolerance

Producers should likely not plant the farming operation to one cotton variety. A question should be "do I have plant diseases or Root knot nematodes in this specific field?" Although we have not been able to identify substantial acreage with this pest in Oklahoma, varietal tolerance or resistance will be critical for managing this. One thing to consider is whether you know which disease is present. If you have a problem with a wilt disease and don't know what it is, then you need to have the problem identified. If known Verticillium wilt pressure is present, then take a look at Dr. Terry Wheeler and Dr. Jason Woodward's data from several locations investigating variety performance under constraints from this particular disease. The same should be considered for Fusarium wilt/Root-knot nematode issues. Many times varieties which do well under Verticillium wilt pressure may not be the same ones which rise to the top with Fusarium or Root-knot nematode pressure. Bacterial blight is an occasional problem in the region. There are several varieties out there that can provide high levels of resistance/immunity. To determine the disease reaction of many currently available varieties, visit the Texas A&M AgriLife Research and Extension Center Website here: http://lubbock.tamu.edu/

Biotech Trait Types

Producers need to ask themselves several questions. Do I want a herbicide-tolerant variety, if so, which system? Weed control has been catapulted forward by the advent of transgenic Roundup Ready Flex, GlyTol, Liberty Link, and Glytol plus Liberty Link ("stacked") cotton varieties. The agronomic capabilities of glyphosate tolerant cotton varieties continue to improve and the weed control system it enables is very effective if properly executed. The Liberty Link system has thus far been more widely adopted in other regions, perhaps due to our tough early season environment in some years. The widely anticipated GlyTol, the proprietary glyphosate tolerance trait from Bayer CropScience (BCS) has been approved by regulatory agencies and has been launched. In 2012, there were several varieties with GlyTol/Liberty Link "stacked" technologies. As for insect protection, the Bollgard II and Widestrike technologies have provided outstanding lepidopteran pest control. Based on our local pricing, these technologies have been widely planted on Oklahoma cotton acres. Because of the lack of disruption of beneficial arthropods by insecticides used to target bollworms, etc., aphids will likely not be flared which is of considerable value.

2013 Texas A&M AgriLife Extension Profitability Spreadsheet

An Excel spreadsheet has been developed by Extension agricultural economists Jay Yates and Jackie Smith at the Lubbock Center. The spreadsheet allows the users to select various crops and input their operation's data. This spreadsheet covers a multitude of summer crops including alfalfa, corn, corn silage, cotton, grain sorghum, sorghum silage, guar, peanuts, sesame, sunflowers, etc. The user can enter prices, input costs, etc and calculate returns. This spreadsheet is available here: http://agrilife.org/southplainsprofit/

RB

Insecticide Seed Treatments for Thrips Control

Now is the time to decide on whether to use a seed treatment or wait to control thrips by foliar spray application if damaging populations develop. There are pros and cons to both options. Seed treatments are easy to use and relatively safe to handle. In-season chemical control application timing is critical and weather plays a part. One of the "pros" of waiting is that added expense only occurs if a damaging population occurs and a decision is made to treat. Also cotton has a great ability to compensate for early damage in Oklahoma growing conditions. If you decide to wait for foliar application, this will be discussed in later newsletters.

There are a number of seed treatments on the market which include Gaucho Grande, Cruiser, Avicta Complete Cotton, and Aeris. The length of control is dependent upon

growing conditions and thrips pressure. Additional follow-up thrips control can sometimes be warranted after using any of the below listed seed treatments.

- Gaucho Grande, Acceleron I, and generics (imidacloprid, a systemic neonicotinoid insecticide) are weak against western flower thrips, our primary species in Oklahoma. If onion thrips are the only species they provide acceptable control. The length of control for western flower thrips lasts about 7 days[1].

- Aeris (imidacloprid and thioidicarb). The added thiodicarb increases western flower thrips control and provides some nematode control. Thrips control generally lasts 14-18 days[1].

- Cruiser (thiamethoxam) is another systemic neonicotinoid but extends control of western flower thrips. The length of thrips control is generally about 14-18 days[1].

- Avicta Complete Cotton and Acceleron N both contain multiple products including upgraded fungicides. Length of western flower thrips control is about 18-21 days.[1].

For all of the above treatments 21 days is the maximum length of control. A cotton plant can still sustain thrips damage until past the fourth true leaf stage. In some years, because of varying growing conditions, this is adequate. In other years the crop may not reach this stage after 21 days, and thus may not be adequate. Therefore, it may be important to keep cotton growth and development rate and foliar thrips control products in mind.

[1] Dr. David Kerns (formerly Texas AgriLife Extension Entomologist, Lubbock; currently Louisiana State University Professor/Fields Crops Entomologist, Winnsboro) provided the length of control for each treatment.

JG

Preplant Weed Control

Numerous studies have shown that leaving weeds unaddressed for an extended period results in a loss of valuable resources such as moisture and fertility (namely nitrogen). I think we can all agree that this year we definitely need to manage our resources as well as possible in order to rebound from 2012. Taking out these weeds as early as possible is an essential part of this process. Many producers in Oklahoma have adopted limited or no-till production techniques. Due to the lack of tillage in these systems, producers often experience an increase in winter and spring annual weed problems including

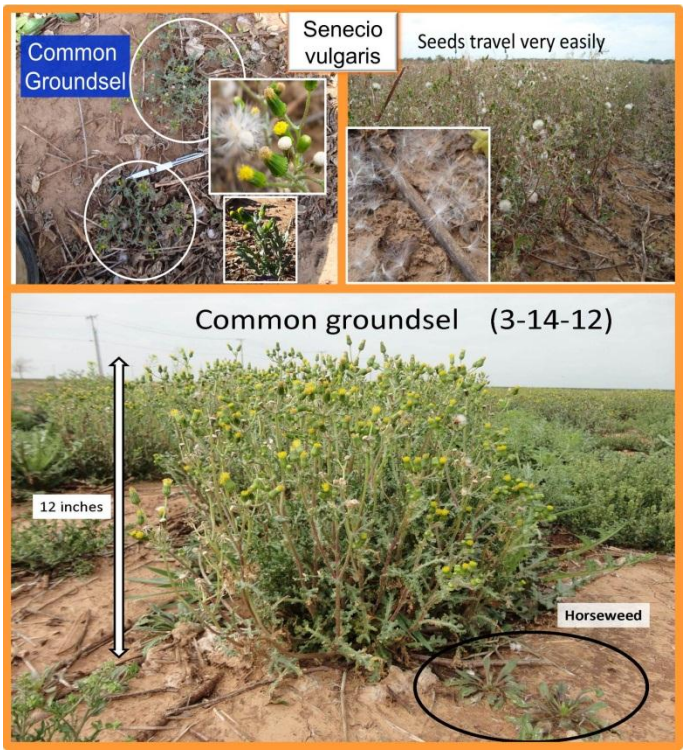
horseweed, Russian thistle and kochia. Consequently, preplant burndown herbicides are essential to replace tillage as the primary weed management tool in these systems. Two of the most troublesome winter/spring weeds present in limited tillage or no-till cotton fields are Russian thistle and horseweed. Weed management research conducted by Dr. Wayne Keeling in the High Plains has focused on the evaluation of different products for the control of Russian thistle. In his research, paraquat has shown excellent activity on Russian thistle, but has not been effective on horseweed. In Oklahoma, glyphosate applied alone has proven very inconsistent at best when trying to control horseweed. In addition, the recent confirmation of glyphosate resistant horseweed in (several areas of) Oklahoma magnifies the importance of additional chemistries. Studies conducted in Oklahoma have shown that effective control of horseweed can be achieved by including dicamba (Banvel, Clarity, etc.) or 2,4-D with glyphosate. However there are some caveats that go along with their use. First, weed size at application time is critical for success. Excellent control of horseweed has been observed when applications have been made to horseweed in the rosette stage (flat or prostrate, prior to bolting or vertical growth). **Secondly, it is important to take note of the plant back restrictions required for both dicamba and 2,4-D. When using dicamba, planting may occur 21 days after an application as long as 1 inch of rainfall has been received within that period. In addition Dicamba is not recommended for use in areas that receive less than 25 inches of annual rainfall. For 2,4-D, studies have shown that planting may occur 30 days after application without concerns of crop injury or yield reduction.**
The following flyer is a reminder we often distribute at meetings to remind growers of both the need and our best recommendations for preplant horseweed control in the spring (if you want download a copy, click here).

In addition, BASF has recently released the new product "Sharpen." Sharpen is considered a PPO (protoporphyrinogen-oxidase) inhibitor and provides both burndown (postemergence) and residual (preemergence) activity on many broadleaf weeds. It

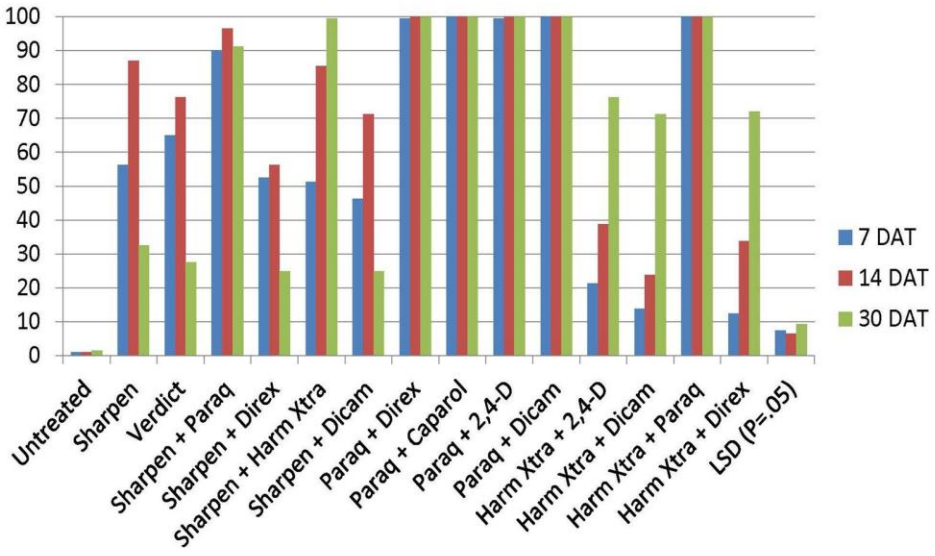
makes for a great tank-mix partner with the standard horseweed treatments listed above. Growers interested in trying Sharpen need to be aware of a few important facts regarding this herbicide. **The label states that 42 days and 1 inch of rainfall must occur after application before cotton may be planted (for applications at 1 oz/A). In addition it is very important growers take note of the recommended adjuvants when using this product. Also, the label recommends the addition of an MSO (methylated seed oil) or crop oil concentrate along with ammonium sulfate. Substituting with other adjuvants is not recommended and will definitely reduce the effectiveness of this herbicide. Growers should also take note of the restrictions on coarse soils (cotton injury may occur on coarse soils with less than 1.5% organic matter). In addition the label states that growers should not apply Sharpen in areas where an at-planting application of an organophosphate or carbamate insecticide is planned or severe injury may result.** Remember, when utilizing these recommendations, the most important thing to remember is that the key to successful horseweed control revolves around the weed size at application. Making applications according to the calendar (instead of weed size) can easily lead to dissatisfaction.

Common groundsel has become a challenge in many no-till fields over the past few years. It is a winter annual that can emerge any time from late fall or winter through early spring. A unique characteristic of this weed is that it begins to flower soon after emergence in winter and will continue to grow and flower through cotton planting time. Similar to horseweed, the seeds of common groundsel disperse in wind which results in rapid spread from uncontrolled areas (figure 1). Many grower's recent encounters have resulted in glyphosate applications followed by "horseweed-type" hormone (2,4-D or dicamba) treatments that often fall short the second time around.

One common producer field observation is that frequently this weed tends to be found in conjunction with horseweed. Since horseweed continues to be one of the top weed pests that growers face in limited tillage production, one of our objectives was to evaluate the performance of standard horseweed recommendations for the control of common groundsel. In addition, very few labels cite control of this particular weed. Sharpen, paraquat and Harmony Extra XP are three products which list groundsel control on the label. Two trials were initiated in the spring of 2012 in order to better define current options available to growers. Separate treatments were applied at each of the two locations. Site 1 focused on the use of products listing groundsel on their

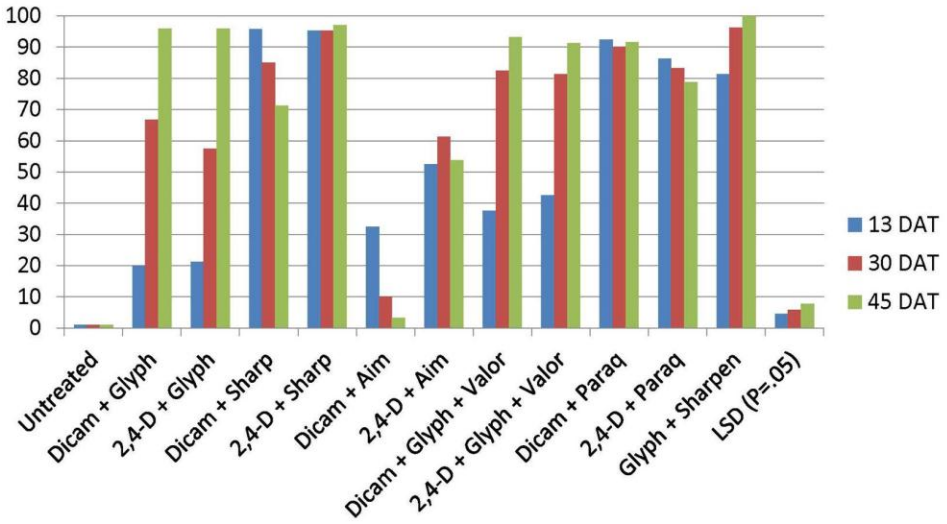


label. Fifteen treatments were applied on February 16th, 2012 focusing on the performance of Sharpen, paraquat or Harmony Extra XP. Treatments at Site 2 more closely resembled local horseweed control programs and focused on the inclusion of 2,4-D or dicamba. These treatments were applied on February 29th, 2012. The common groundsel was past the ideal stage (< 3 inches) at both sites ranging from 3 to 6 inches in height at application. Treatments were applied at 28 psi with flat fan nozzles. Treatments from each site are listed in Figures 2-3 which also contain each trial's respective data.



Untreated
1 oz/a Sharpen + 17 lbs/100 gal amm. sulfate + 1% mso
5 oz/a Verdict + 17 lbs/100 gal amm. sulfate + 1% mso
1 oz/a Sharpen + 0.50 lb ai/a paraquat + 17 lbs/100 gal amm. sulfate + 1% mso
1 oz/a Sharpen + 32 oz/a Direx + 17 lbs/100 gal amm. sulfate + 1% mso
1 oz/a Sharpen + 0.50 oz/a Harmony Xtra XP + 17 lbs/100 gal amm. sulfate + 1% mso
1 oz/a Sharpen + 8 oz/a dicamba + 17 lbs/100 gal amm. sulfate + 1% mso
0.75 lb ai/a paraquat + 32 oz/a Direx + 1% coc
0.75 lb ai/a paraquat + 32 oz/a Caparol + 1% coc
0.75 lb ai/a paraquat + 1.0 lb ai/a 2,4-D + 0.25% nis
0.75 lb ai/a paraquat + 8 oz/a dicamba + 0.25% nis
0.50 oz/a Harmony Xtra XP + 1.0 lb ai/a 2,4-D + 0.25% nis
0.50 oz/a Harmony Xtra XP + 8 oz/a dicamba + 0.25% nis
0.50 oz/a Harmony Xtra XP + 0.75 lb ai/a paraquat + 0.25% nis
0.50 oz/a Harmony Xtra XP + 32 oz/a Direx + 1% coc

Figure 2. Common groundsel control with Sharpen, paraquat and Harmony Extra XP



Untreated
8 oz/a dicamba + 32 oz/a glyphosate(4lb) + 17lbs/100gal amm. sulfate + 0.25% nis
1.0 lb ai/a 2,4-D + 32 oz/a glyphosate(4lb) + 17lbs/100gal amm. sulfate + 0.25% nis
8 oz/a dicamba + 1.0 oz/a Sharpen + 17lbs/100gal amm. sulfate + 1% mso
1.0 lb ai/a 2,4-D + 1 oz/a Sharpen + 17lbs/100gal amm. sulfate + 1% mso
8 oz/a dicamba + 1oz/a Aim + 1% coc
1.0 lb ai/a 2,4-D + 1oz/a Aim + 1% coc
8 oz/a dicamba + 32 oz/a glyphosate(4lb) + 17lbs/100gal ammon. sulfate + 2 oz/a Valor + 1% coc
1.0 lb ai/a 2,4-D + 32 oz/a glyphosate(4lb) + 17lbs/100gal amm. sulfate + 2 oz/a Valor + 1% coc
8 oz/a dicamba + 0.50 lb ai/a paraquat + 0.25% nis
1.0 lb ai/a 2,4-D + 0.50 lb ai/a paraquat + 0.25% nis
48 oz/a glyphosate(4lb) + 1 oz/a Sharpen + 17 lbs/100 gal amm. sulfate + 1% mso

Figure 3. Common groundsel control with 2,4-D and dicamba

Figure 4. Common groundsel control next to untreated plot

Sharpen applied alone (or when combined with dicamba) did not effectively control common groundsel. However, tank-mixing Harmony Extra XP with Sharpen did result in very effective control. Similarly, all treatments including paraquat were very effective at controlling common groundsel. This suggests that future work may be needed to explore potential paraquat rates that may be more economical but still remain effective. In addition, if choosing a tank-mix partner for Aim, these results suggest a much more effective relationship with 2,4-D as opposed to dicamba for common groundsel control. Although Sharpen plus dicamba has been observed to be very effective at controlling common groundsel in the past, these results suggest that the weed size at application (larger than the recommended <3 inch stage) could have reduced the effectiveness of this treatment. Though many producers have found glyphosate alone to be very ineffective, these trials indicate that the inclusion of glyphosate (with either 2,4-D or dicamba) is still beneficial since all treatments including glyphosate provided at least 90% control of common groundsel.

Weed Control and Resistance Issues in the 2013 Season

Now is a good time to be considering your overall approach to cotton weed control for 2012 (as it relates to the resistance issue). I think we all have read extensively about how herbicide resistant weeds have taken most of the countryside. In fact with the recent discovery of glyphosate resistant palmer amaranth to our west (in Texas South Plains counties including Hale, Hockley and Terry near Lubbock) Oklahoma seems to be surrounded. Actually there are already several species of herbicide resistant weeds in Oklahoma. ALS resistant Italian ryegrass, cheat and palmer amaranth, and glyphosate resistant waterhemp and horseweed have been already been documented in several areas of Oklahoma. Our biggest concern at this point is preventing (or at least delaying) the development of glyphosate resistant palmer amaranth populations in Oklahoma. I think the road map provided by other areas of the country shows us that

this particular weed has the potential to have the greatest negative impact on Oklahoma due to its prolific nature. What can we do to prevent or delay the development of glyphosate resistant palmer amaranth in Oklahoma? The use of residual herbicides is the key component in our defense against this threat. Fortunately in cotton we still have many effective options. I think there are multiple reasons why glyphosate resistant palmer hasn't taken over the southwest just yet. One that is agreed upon by most is the continued use of yellow herbicides. This continues to be the best (and most economical) advice we can give cotton producers. Tank-mixing preplant burndown and early post herbicides is another key component for us. In the southwest when we do receive adequate rainfall it is usually in the early part of the season (spring and on into June). In order for residual herbicides to be effective one of the following three requirements must be met - shallow tillage, rainfall or irrigation. Taking advantage of the rainfall component is critical. Therefore we place more importance on incorporating residuals early-season, when we still have good chances to receive activating rainfall. Once we hit July, our chances of getting the full benefit from a residual herbicide depend highly upon whether or not we own a sprinkler. Therefore, especially in areas without overhead irrigation, defending against this threat is an early-season battle.
In closing, while visiting with producers, some have made the comment that things will soon take care of themselves because technological advances coming in the pipeline will bail us out of this potential train wreck. Unfortunately these technologies are several years out and don't currently provide us with any guarantees that life will be a breeze in the future. Also, glyphosate is still very valuable technology because it is still effective on many other weed species. Stewardship now will help sustain that value for the future.
SO

Herbicide Program Suggestions
For Fighting/Preventing Glyphosate Resistant Pigweed
In Oklahoma Cotton

Weed Control Programs in Glyphosate Tolerant Cotton Varieties (Roundup Ready Flex, GlyTol)

	Production System	Preplant Burndown or Incorporated	At-plant Burndown or Preemerge	Early to Mid-season Postemergence	Late-season Layby-Hoods
1	Minimum or No-till	Dicamba or 2,4-D + Glyphosate	Glyphosate + Prowl H20	Glyphosate + Staple LX	Aim + Direx
2	Minimum or No-till	Dicamba or 2,4-D + Valor + Glyphosate	Gramoxone SL + Direx	Glyphosate + Warrant	Glyphosate + Direx
3	Minimum or No-till	Dicamba or 2,4-D + Sharpen + Glyphosate	Glyphosate + Dual II Magnum	Glyphosate + Prowl H20	Caparol + MSMA
1	Conventional tillage	Treflan or Prowl H20	Caparol	Glyphosate + Staple LX	Valor + MSMA
2	Conventional tillage	Treflan or Prowl H20	Direx	Glyphosate + Warrant	Aim + Caparol
3	Conventional tillage	Treflan or Prowl H20	Staple LX	Glyphosate + Prowl H20	Direx + MSMA

Without the use of residuals Palmer amaranth can emerge all season long…plan ahead!

Please give credit to this newsletter if any information is reproduced or incorporated in any other communications. Thank you.

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SEND US A COMMENT BY EMAIL

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