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Cotton Insects

Meymik - A new Aldicarb (replacement for Temik)

Temik has always been the "Cadillac" treatment for controlling thrips and nematodes in cotton. However with the halt of production of Temik last year, very little product remains for use in 2012 (probably only what was bought and stored in barns). Since then a new aldicarb called Meymik 15G has been registered with the EPA. Here is what is currently known about this new product.

- Joint venture by Ag Logic LLC and the MEY Corporation, both from NC.
- Made and probably formulated in China.
- Not available until 4th quarter of 2012.
- Will be a corn cob grit formulation initially with gypsum and Lock n Loads coming in 2014.
- No one in the US has tested this material.
- Will be in short supply in 2013, should be plenty beyond that.
- No idea regarding price.
- Will not have to adhere not the Bayer/EPA phase out plan. Open ended registration.
- Is expected to go through reregistration as it relates to impact on pollinators and pesticides in cotton.

Bt or Non-Bt Cotton

Undoubtedly the most effective means for controlling pink bollworms, bollworms, beet armyworms and fall armyworms is to plant a cotton variety containing Bt genes. These include those varieties containing Bollgard 2 (Cry1Ac + Cry2Ab), and Widestrike (Cry1Ac + Cry1F) technologies.

Depending on the circumstances, a grower may opt to not plant a Bt cotton variety. Reasons for this decision vary but include not wanting to pay the tech fee, no recent history with troublesome worm populations, choosing a non-Bt variety based on desired agronomic characteristics, or resistance to disease or nematodes. Regardless of the reason, there are many growers who do not plant much Bt cotton.

Is the cost of the tech fee worth it? Based on the Seed Cost Comparison Worksheet provided by PCG, (The 2012 Seed Cost Comparison Worksheet is available here: www.plainscotton.org), and a 52,272 seed/acre seeding rate, the tech fee for Bollgard II is roughly $8.60 when stacked with Flex, while Widestrike is about $9.00 per acre. Depending on the insecticide selection, the cost for treating for bollworms (insecticide + application) runs about $8.00 per acre per application, while armyworms will cost about $13.00 per acre per application. However, when treating for bollworms with a pyrethroid, which is the most common treatment, you stand the chance of flaring aphids and possibly mites. Aphids and mites will usually cost about $7.00 and $18.00 per acre to treat respectively. Also, there is the "nickel and diming" damage low populations of worms cause. In most years we can get by without treating or may be

have to only make a single application for bollworms on non-Bt cotton; but there is no guarantee. Additionally, Bt cotton is not immune to caterpillar damage. Although not common on the High Plains, we occasionally encounter fields of Bollgard 2 or Widestrike that require insecticide oversprays for caterpillar control.

In addition to direct costs associated with spraying for worms in cotton there is the peace of mind factor and getting a good night's sleep not having to worry about worms. In essence, it's all a gamble and depends on how much risk you are willing to take to gain whatever benefit you see by planting a non-Bt variety.

THRIPS

Preventive or foliar treatments for thrips

Deciding on whether or not to use a preventive thrips control product, and which one to use can be a difficult decision, and the benefit of these treatments is dependent on the weather and thrips pressure. Neither of which is predictable. However, you can make reasonable assumptions and guesses based on historical data and long-range forecasts.

Thrips build up populations primarily in small grains, flowering weeds and wild grasses; with wheat being the largest source of thrips, particularly during dry conditions. Once the wheat begins to mature and dry down, thrips will disperse out of the wheat in extremely high numbers, and will go to pretty much whatever is green in the area; notably newly emerging cotton. Thus, if you are growing cotton in area where a lot of small grains are produced, using preventive thrips treatments may be justified.

Another consideration when deciding on whether or not to use a preventive treatment for thrips is the weather. In 2007 we had a thrips test where cotton treated with Temik at 3.5 lbs/ac yielded 350 lbs-lint/ac more than an untreated check, but in 2008 similar studies saw no benefit from using Temik. Why the difference? Primarily temperature. During the 21 days post emergence in 2007, the average daily high and low was 82 and 54 °F, respectively; while in 2008 the average daily high and low was 94 and 58 °F, respectively. At the 2008 test location, we noticed that area cotton that had been planted 10 to 14 days earlier appeared to suffer significant thrips damage when growing under cooler conditions. Under warmer conditions, the cotton is simply able to outgrow some thrips damage. Thus, if you are growing cotton in an area that typically experiences cool temperatures and thrips commonly exist, then using a preventive treatment may be justified. However, if you are in an area where thrips populations are not normally severe and temperatures are relatively warm, you may opt for foregoing preventive thrips treatments and use curative foliar sprays as needed instead.

Things to consider when using foliar applications for thrips control

Timing can be critical. Controlling thrips during the first 2 weeks post crop emergence appears to be the most important period; especially under cool conditions. You need to be "Johnny on the spot" with these applications when thrips are numerous; even a few days delay can be detrimental.

Avoid automatic treatments. Automatically adding a foliar thrips material in with a Roundup application may not be necessary or may be poorly timed. Often either the weeds aren't present when the thrips are or vice versa.

Scout for thrips. Go out and visual assess if thrips are present. Pull up plants and thoroughly search them or beat the plants inside a plastic cup.

Don't spray based on damage. The damage you see today happened 3 to 5 days earlier and you may have already suffered yield loss. Spraying based on damage is essentially a revenge treatment.

Spray based on thresholds. Use an accepted action threshold to help you determine whether or not you should treat.

Seed treatments for thrips

Seed treatment options for thrips control include Imidacloprid (Gaucho 600, Gaucho 480, generics, Cruiser, Avicta Complete Cotton, Avicta Duo Cotton, and Aeris. The length of thrips control will vary by product, soil moisture, precipitation, and thrips species and thrips pressure. Additionally, your choice of a seed treatment should consider nematode and disease potential as well. Depending on which seed company you are obtaining seed from, you will have different options on seed treatment.

As you can see from this chart, some of the companies have limited options in some categories or require you to purchase one component to get another. For example to get a premium fungicide you may be required to also pay for an insecticide. If you cannot obtain the treatment you want from the seed company then you may need to get the treatment applied "downstream" from a company or dealer that applies seed treatments.

Let's look at what the various seed treatments bring to table in regard to thrips control.

Imidacloprid is a widely used thrips control product in many parts of the cotton belt, but tends to be weak against western flower thrips which is the predominant thrips in parts of the Texas High Plains. For us, imidacloprid will usually provide about 7 days post emergence thrips control. However, if you end up with primarily onion thrips instead of western flower thrips as was the case in many areas last year, you can expect it to perform equally to the other seed treatments. Bayer CropScience is no longer offering imidacloprid by itself; you will have to purchase in the form of Aeris (see below) or get it applied by a dealer/distributor that treats seed independently.

But because you don't know which species of thrips will show up, you need to plan for the worst; western flower thrips. For his species, the better thrips control seed treatments include the Cruiser, the Avicta products and Aeris. Cruiser contains the single active ingredient thiamethoxam, and is in the same insecticide class imidacloprid. However, Cruiser is more active towards western flower thrips than imidacloprid and will provide 14 to 18 days post emergence thrips control.

Aeris is a combination of imidacloprid and thiodicarb. Against western flower thrips, the inclusion of thiodicard significantly increases the length of control of Aeris over imidacloprid alone to 14 to 18 days post emergence control. Thiodicarb also has some nematode activity. Prior to 2009, Aeris seed treatments automatically included the inclusion of the premium fungicide Trilex Advanced, but now Aeris can be applied separately.

Avitca seed treatments are available in two options, Avicta Complete Cotton and Avicta Duo Cotton. As far as thrips are concerned, these products are identical and are the same as Cruiser. They have the same active ingredient as Cruiser for thrips (thiamethoxam), and like Cruiser, will provide 18 to 21 days of post emergence thrips control. The differences among Cruiser, Avicta Complete Cotton and Avicta Duo Cotton are the other active ingredients. Both of the Avicta products, in addition to thiamethoxam, include abamectin for nematode management, and Avicta Complete Cotton also includes the premium fungicide treatment Dynasty CST.

Poncho/Votivo is a new seed treatment being offered by Bayer CropScience. The Poncho portion is clothianidin, which is similar to thiamethoxam and imidacloprid. However, Poncho is weak on thrips, but has good activity towards wireworms; similar to thiamethoxam and imidacloprid. The Votivo portion is a bacterium that covers the roots that is meant to form a barrier to nematodes.

Regardless of the seed treatment utilized, keep in mind that effective control will usually not last more than 21 days under constant thrips pressure, and follow-up foliar sprays may be necessary to protect the crop once these treatments wear off. DLK

Cotton Agronomy

Recap of 2011 Crop

According to National Agricultural Statistics Service data (NASS), cotton producers in the High Plains region planted around 4.6 million acres in 2011. Estimated harvested acres were 1.84 million for the region which is a recent record low due to 60.1% of planted acres abandoned. The January estimate for total production was 1.93 million bales, which if it stands will be the lowest production for the High Plains since 1993. The 2011 crop year in the High Plains was difficult at best due to extreme drought conditions and sustained high winds through the early part of the growing season when producers were trying to get a stand established. Most irrigated producers did eventually get a stand but as the drought continued to intensify found it difficult if not impossible to maintain acceptable growth. The dryland acreage across the High Plains unfortunately did not have enough moisture, if any, for germination which resulted in complete dryland crop failure.

Although yields were down across the region, results from the Lubbock and Lamesa classing office indicates better than anticipated fiber quality for 2011. We ended up with around 84% color grades 11 or 21, and 95% leaf grades 3 or better, the same as 2010. Staple length averaged 34.8 and was slightly lower compared to 2010 with a 35.8 staple average. Also, strength was down slightly at 29.69 g/tex when compared to 2010 with an overall 30.07 g/tex average. Micronaire, an indirect measure of maturity, was excellent with an average value of 4.37 with only 7.7% 3.4 or lower and only 4.4% of 3.2 or lower. Furthermore, 28.9% of the bales classed received premiums for 3.7 to 4.2 micronaire. However, due to the high heat unit accumulations throughout the growing season, 6.8% of the bales classed had micronaire values of 5 or higher and received a high micronaire discount. Uniformity was approximately 80% (similar to 2010). Bark contamination for 2011 (13.8%) was up slightly from 2010 (9%).

Winter precipitation in the High Plains has continued to be below normal. If we do not see some significant moisture soon, dryland establishment will be difficult again for 2012.

Planting Considerations

IMPORTANT NOTE: Although some areas have received varying amounts of much needed precipitation recently, much more is needed to break the drought. Should we experience similar conditions as 2011, it is highly recommended that cotton producers stay in contact with their crop insurance provider/agent to maintain insurability of their crops in 2012.

Cotton production is a complicated job. Just make sure that you do your homework and spend input money wisely. With that said, producers need to be aware especially in District 1N that managing for earliness should be the major focus during the growing season. Prior to 2010, several years of crops with substantial amounts of long, immature fiber for which is generally difficult to obtain good prices in the global market have been produced. Although we cannot control weather impacts, selection of varieties which tend to be somewhat earlier in maturity and managing those varieties for earliness should help. Should we receive more "normal" rainfall in 2012 (hopefully) excessive irrigation amounts, especially late, can push a lot of late set bolls (which contain much immature fiber with poor length distribution) to the point of providing some pounds of yield at the sacrifice of overall maturity. This is a difficult box that we need to find a way out of in order to improve crop quality for global markets. If producers have specific Verticillium wilt or Fusarium wilt disease issues with which they are dealing, results from trials conducted by Drs. Terry Wheeler and Jason Woodward under high disease pressure are available on the Texas AgriLife Research and Extension – Lubbock website at http://lubbock.tamu.edu . It is important for growers to consider managing individual fields based on the specific disease presence or absence and overall goals.

Variety Selection Process

Selecting productive cotton varieties is not an easy task especially in the Texas High Plains, an area 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. Don't forget to target specific diseased fields with the best varieties under those conditions.

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.

Dr. Jane Dever has published the Cotton Performance Tests in the Texas High Plains and Trans Pecos Areas of Texas 2011 report. This report contains data on numerous entries in small plot trials. Small plot trials enable producers to observe results from a large number of entries at multiple locations. These trials are normally conducted under uniform, disease-free conditions, unless a test is specifically targeted toward a certain disease. This is an outstanding resource and provides much information on variety performance, including lint turnout, fiber quality, earliness, plant height, and storm resistance. Results from locations with Verticillium wilt, Root-knot nematode, and Bacterial blight are also available in this publication. This 2011 report has been posted on the Lubbock Center Web site under What's New: http://lubbock.tamu.edu/files/2012/01/2011CottonBooklet.pdf .

The Extension 2011 Systems Agronomic and Economic Evaluation of Cotton Varieties Report will soon be available. This report contains approximately 15 locations of replicated cotton demonstrations conducted by Extension agents in producer-cooperator fields across the region. Since these trials are planted and harvested with producer-cooperator equipment, the number of entries per site is generally less than 15, and many times less than 10. However, these trials reflect a wide range of cultural practices, locations, irrigation types, etc. The absence or degree of presence of disease may effect results of some Extension variety demonstrations, and taking the time to read the site descriptions is becoming as important as looking at the results tables. There are tables that summarize data for yield, micronaire, staple, uniformity, and strength across locations. These tables provide a quick glance at the performance of each entry at the respective locations.

When it comes to variety selection in the High Plains, several factors are important to consider.

Maturity (Earliness)

We can't predict the weather, but producers should recognize that 2001, 2002, 2003, and more recently, 2011 were record high micronaire years in the High Plains; however, things can change. As we have experienced, higher yielding crops with lower maturity resulting in lower average micronaire can occur. Producers should be looking very hard at the relative maturity and micronaire values of the new varieties. 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. In years such as 2009, with a difficult finish due to poor maturing weather at the end, many fields planted to some of these varieties had somewhat lower yield and more immature fiber resulting in lower micronaire. Dr. Dever's cotton performance test report contains an earliness evaluation (expressed as percent open bolls on a given date). These results are generally provided across all locations.

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, but we still have a long way to go to address maturity. 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. Although in 2011 overall Verticillium wilt disease incidence was down, in a "normal" year this can also be a contributing factor. This in turn can be aggravated by excessive nitrogen fertilization and/or soil residual nitrogen. There is good evidence that excessive nitrogen fertilization may also play a role in immaturity. There are comments below concerning testing for residual nitrogen.

Storm Resistance

Storm resistance is still a concern for growers in our area. Even though we 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. 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 low storm resistant varieties 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. More storm resistant varieties are better adapted to our harvesting conditions and they are more likely to survive damaging weather prior to harvest without considerable lint loss. Inquire about the storm resistance of any variety on your potential planting list. If you do choose an open-boll variety, 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 results from Dr. Dever's cotton performance testing program are valuable for looking at several varieties across location. Also, as began in 2010, the Systems Agronomic and Economic Evaluation of Cotton Varieties in the Texas High Plains also contains visual observations for storm resistance at several locations. With some growing interest in picker harvesting, excessive storm resistance can be a negative and possibly result in reduced picker harvesting efficiency.

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 and Liberty Link cotton varieties. The agronomic capabilities of Roundup Ready Flex cotton varieties continue to improve. The Liberty Link system has been more widely adopted in other areas, perhaps due to our tough early season environment in some

years. Good to excellent varieties with these herbicide traits are out there. The GlyTol (GT) glyphosate tolerance trait as well as GlyTol stacked with Liberty Link (GL) from Bayer CropScience (BCS) was sold in our region in 2011. As for insect protection, the Bollgard 2 and Widestrike technologies have provided good lepidopteran pest control given our typical worm pressure. Based on our local pricing, these technologies should be considered, especially for irrigated farms.

Conventional Varieties

Some offerings of conventional varieties are still being made by a few seed companies. The companies of which I am aware include All-Tex Seed in Levelland. They are selling several conventional varieties in 2011, identified as 1203, A102, LA122, and OL220. Older conventional varieties such as Xpress, Excess, Atlas, and Top-Pick are also available. Additional conventional varieties are being sold by Seed Source Genetics located in Bishop, TX. Some of these varieties have been tested in Dr. Jane Dever's performance trials.

Ease of Management

Plant type should be considered because of substantial variation in available water input across the region. Under high water inputs, some varieties can get "growthy" and require diligence with regard to plant growth regulator (mepiquat chloride) application. Other varieties may be more compact and not as large. Some growers like the challenge of managing some of these "growthy" types, and some do not. Smaller plant types are generally easier to manage and require less plant growth regulator expense for growth control.

Deep Soil Sampling for Residual Nitrates

With fertilizer prices skyrocketing in 2008, and the possibility of future price spikes, special emphasis is being placed on reminding producers about proper soil sampling and testing techniques. One of the most costly fertilizers is nitrogen (N). Nitrogen is important for producing protein in plants and crop demand is very much yield driven. Establishing a realistic yield goal is the first task. Producers shouldn't take the attitude that cotton is like a grain crop. The more nitrogen applied when given high water doesn't necessarily translate into higher yield. Many times we can retain the fruit in a high water input field but not have time to mature that fruit. This results in a large number of pounds of lint, but can significantly reduce maturity because the late-set bolls do not have adequate time to mature. Excess N can aggravate the problem by delaying crop maturity, especially if poor maturity weather is encountered in September and October as was the case in many fields in 2009. There is a fine line between obtaining an adequate yield and having good maturity in the crop, especially north of Lubbock. Excessive N can result in 1) Unwanted crop growth which in turn will require plant growth regulator (such as mepiquat chloride) application - especially on varieties that are inherently "growthy", 2) Increased Verticillium wilt problems, 3) Increased aphid problems, and 4) More harvest aid challenges at the end of the season.

Over the last several years agronomists across the state working in cotton have been surveying residual N in the soil profile in producer fields. What many fields are exhibiting is a considerable

amount of N that should be accounted for when determining how much N fertilizer to apply. In our region, many fields may encounter this deep N somewhat later in the season resulting in a surge of green at a time when we would like for the fields to become more N deficient. Based on research projects this is likely a contributing factor to lower micronaire in some fields in years with poor maturing conditions. Furthermore, due to the lack of rainfall during the 2011 growing season and reduced cotton yields in most areas, significant amounts of residual N may be available.

The basic formula for success is this: 1) Determine the yield goal in bales per acre for the field based on irrigation capacity, varietal performance, early season profile moisture, etc. 2) Multiply this yield goal times 50 pounds of N per bale of production. 3) Deep sample for residual soil N down to the 18-24 inch depth. 4) Submit the samples to a soil testing laboratory, fully recognizing the depth that the sample represents. 5) Use the appropriate conversion factor based on the depth of sampling to convert the nitrate-N test results from the laboratory to pounds of N per acre IF the laboratory does not provide this service. 6) Subtract the amount of residual N found from the N fertilizer needed based on the yield goal. If high nitrate-N irrigation water is used, then additional steps must be made to compensate for N delivery during the growing season. Based on 10 ppm nitrate-N concentration in irrigation water, application of an acre-ft (12 acre-inches) during the growing season will result in about 27 pounds of N being simultaneously applied. Few High Plains wells will have nitrate-N concentrations of that magnitude. However, in the event of high fertilizer prices, the water should be checked and credits made for this against overall N fertilizer application. There are publications on the Lubbock website http://lubbock.tamu.edu/programs/crops/cotton/fertility which deal with this issue. In 2009 and 2010 a deep sampling campaign took place across the region where 113 fields were sampled to 24" and residual N was determined. Of those 113 fields, 17 were dryland and 96 were irrigated. For the irrigated, 6 were furrow, 29 were sub-surface drip, 36 were Low Energy Precision Application (LEPA), and 25 were Low Elevation Spray Application (LESA). Overall average total residual nitrate-N was 43 lbs NO_3-N/acre dryland and 52 lbs NO_3-N/acre across all irrigation methods. MSK

Cotton Weed Control

The Importance of Preplant Weed Control in Cotton

It's nearly impossible today to pick up a trade magazine without an article written about the development of Roundup-resistant weeds. Unfortunately, we can add the Texas High Plains to this discussion. To date, there are 13 different weed species in the US and an additional 8 weed species worldwide that have been confirmed to be resistant to Roundup (http://www.weedscience.org/). Our biggest concerns are likely Palmer amaranth, kochia, Johnsongrass, and marestail. One of the main reasons for the selection of herbicide-resistant weeds is the heavy and sometimes sole reliance on a single herbicide to control weeds over the course of the growing season and over several years. Growers on the Texas High Plains have done a good job using several weed management strategies to control weeds and not relying on Roundup as the only tool. With that said, of the 12 fields we investigated last fall, we believe that 8 of them

contain populations of Palmer amaranth that exude a high level of plant tolerance (resistance). Although the amount of cultivation has declined for understandable reasons, we still see plowing and cultivation as an effective strategy against the development of herbicide resistant weeds. We also see the benefit of using other "mode-of-action" herbicides as an important part of successful weed management and as an effective weed-resistance strategy. One of the key herbicide timings with an alternative mode-of-action is the use of preplant herbicides. Effective preplant weed control will conserve soil moisture, allow planting operations to occur without the interference of weeds, and help to provide the critical weed free periods for the first six to eight weeks after crop emergence. One of the major challenges of using herbicides preplant is to ensure that herbicide activity in soil will not reduce crop germination and emergence. A second challenge is to select the proper herbicide(s) for the weeds that need to be controlled.

The use of Prowl (pendimethalin) or trifluralin (several generics available) is the first step towards successful weed management programs in cotton. The strength of dinitroaniline (DNA) herbicides is annual grass control (barnyardgrass, crabgrass, foxtails, panicums, etc.) and control of small-seeded broadleaf weeds such as Palmer amaranth (carelessweed and other pigweed species), Russian thistle (tumbleweed), and kochia (ironweed). Most larger-seeded broadleaf weeds, like annual morningglories, cocklebur, and sunflowers, and perennial weeds are not controlled by these herbicides.

The rate of each DNA herbicide is dependent on soil type. The sandier the soil, the lower the recommended use rate. If soil conditions are dry and large clods are present during mechanical incorporation, herbicide performance will be less effective. Keep in mind that when trifluralin was first used over 35 years ago, farmers were diligent with two-pass incorporation prior to bedding and planting. This resulted in thorough mixing of the herbicide and excellent weed control. In recent years many farmers have cut back on incorporation to save time and money. Some have still achieved adequate weed control while others have observed that poor incorporation allowed for more weed escapes. In cotton, Prowl EC rates range from 1.2 to 3.6 pints per acre in conventional or minimal tillage and from 1.8 to 4.8 pints per acre in no-tillage. Rates for trifluralin (products formulated at 4 pounds per gallon) range from 1/2 to 1 pint per acre for sandy soils, and up to 2 pints per acre on other soils.

The DNA herbicides may be incorporated by mechanical means or by irrigation. Incorporation methods vary widely across the High Plains and across the state. A double-pass method of incorporation is recommended and is most commonly used. Mechanical implements used to incorporate these herbicides include a springtooth harrow, a disk, a double or single stalkcutter, and a rolling cultivator to name a few. The better the implement mixes and uniformly distributes the herbicide in the upper 1- to 2-inches of soil, the better the weed control. Trifluralin should be incorporated within 24 hours after application. Prowl must be incorporated within 7 days after application, but the sooner the better. Prowl EC may be surface applied and then incorporated by rainfall or irrigation. Three-quarters to one-inch of irrigation is necessary to incorporate (activate) these herbicides. Both Prowl EC and trifluralin may be chemigated into the soil. Although water may not be the best way to incorporate Prowl or trifluralin, this may be the only way to use these herbicides in a reduced tillage or no-tillage crop production system. When surface applications followed by irrigation or chemigation methods are used, herbicide rates are generally higher when compared to mechanically incorporated methods. Research conducted at the AG-CARES farm in near Lamesa by researchers with Texas AgriLIFE Research suggested that Prowl EC provided more consistent weed control when compared to

trifluralin when surface applied followed by irrigation for activation, but trifluralin performed better than Prowl EC when chemigated.

Prowl H20 is the newest formulation of pendimethalin. One gallon of Prowl H20 contains 3.8 pounds of pendimethalin formulated as an aqueous capsule suspension. Since it is formulated at a higher concentration than Prowl 3.3 EC, less product is needed on a per acre basis in general. In cotton, Prowl H20 may be applied in conventional, minimum, stale seedbed, or no-till systems as a preplant surface, preplant incorporated, preeemergence, or at layby. It may be applied by ground, air, or chemigation. Use rates vary from 1 to 3 pints per acre in conventional or minimal tillage and 2 to 4 pints in no-till depending on soil texture.

Valor is labeled as a burndown option preplant in cotton. Valor may be used at 1 to 2 ounces per acre with labeled burndown herbicides like Roundup and 2,4-D to enhance the speed of burndown, widen the spectrum of weed control, and provide residual weed control. Do not till after application or the residual weed control may be reduced. A minimum of 30 days and 1 inch of rainfall/irrigation must pass between application and planting in conventionally tilled cotton or crop injury may occur. In no-till or strip-till cotton, a minimum of 14 days plus 1 inch of rainfall/irrigation must occur between application and planting when 1 ounce of Valor is used or 21 days must occur between application and planting when 1.5 to 2 ounces is used. Valor has soil residual activity on several broadleaf weeds including chickweed, dandelion, henbit, marestail, pigweed, primrose, mustard, and sheperdspurse.

DuPont **FirstShot** may be applied as a burndown treatment to control emerged weeds prior to planting. FirstShot at 0.5 to 0.6 ounces per acre may be applied in tank mix with other registered burndown herbicides (Roundup, 2,4-D, Ignite, paraquat) or may be applied at 0.5 to 0.8 ounces alone. Sequential treatments not to exceed 1 ounce per acre may be made during one pre-plant cropping season and allow at least 30 days between applications. FirstShot has good activity on several weeds including cutleaf eveningprimrose, horseweed, and prickly lettuce. There is a 14 day preplant interval between application and planting.

Sharpen (saflufenacil) is currently registered as a preplant burndown treatment 42 days prior to cotton planting. In west Texas, the 42 day interval from application and cotton planting starts when an inch of rainfall/irrigation occurs. Previous studies have shown Sharpen can effectively control kochia, Russian thistle, and horseweed when applied as a preplant burndown.

A study was conducted at Lorenzo in the spring of 2010 and 2011 to evaluate horseweed control following preplant. Applications were made to up to 4-inch rosettes growing in good moisture conditions in 2010 and dry conditions in 2011. Effective control was observed following:

- 2,4-D (16 oz or 32 oz) + Roundup (22 ounces) in 2010 and 2011. The addition of 2 oz of Clarity seemed to improve control in 2011.
- Sharpen (1 oz) + Roundup (22 oz) + Valor (2 oz) + methylated seed oil (MSO) in 2010
- Sharpen (1 oz) + Roundup (22 oz) + MSO in 2011
- FirstShot (0.66 oz) + 2,4-D (16 oz) in 2010 and 2011
- FirstShot (0.75 oz) + Roundup (22 oz) in 2010

Since product labels change from year to year, always carefully read and follow label recommendations for a variety of information, including herbicide rate, adjuvant use, interval restrictions between application and planting, or other application restrictions. PD and WK

Cotton Disease

Record low precipitation and high temperatures clearly had their affects on cotton yield and quality in 2011. While we are all trying to carry on and look forward to the upcoming growing season, there are several disease related considerations that need to be made. In general, conditions that are optimal for cotton growth, favor disease development. The harsh conditions experienced last season resulted in a few obscure observations. The first being low Verticillium wilt pressure. While reports of Verticillium were made around the region, incidence of the disease was lower than usual no doubt resulting from the dry conditions. This brings to mind the old adage 'out of sight out of mind'. Don't think that, just because we didn't see any disease last year that it does not pose a problem this year or in the future. In ordering seed, take into consideration the relative disease pressure over the past few years and make decisions accordingly. While differences in variety performance in the 2011 Verticillium wilt trials were observed, many of those differences were made in the absence of disease. I am advising that producers weigh the use of data from last season and use them sparingly, focusing on variety performance and rankings from previous years. A link to the response of cotton varieties to diseases is available at http://lubbock.tamu.edu/files/2011/11/DiseaseRecommendations.pdf.

Despite the hot, dry conditions that we experienced early in the growing season, 2011 was among the worst years I have seen for seedling disease. This sounds counterintuitive, as seedling disease is generally favored by cool, wet conditions. However, that is exactly what was occurring in the soil after planting, as producers routinely applied irrigation to ensure adequate stands. Many fields experienced poor stands because of the application of cool irrigation water. Seeds that were planted deeper in the soil (in good moisture) had a difficult time emerging, which favors seedling disease development. Furthermore, planting into dry soil and watering the crop up, often caused seed to settle, resulting in big shank and pre-emergence seedling disease.

Various seed treatments are available, as standard and down-stream treatments. Results from previous studies have shown that improved stands are generally achieved with the premium treatments; however, yield increased are only observed under high disease pressure, which may result from early planting (prior to soils warming above ~65 °F), a cold front or the application of irrigation or heavy rainfall soon after planting.

Root knot nematodes remain an economically important pest. The loss of Temik 15G has greatly limited producers management options. Varieties such as Deltapine 174RF, Phytogen 367WRF, Stoneville 4288B2F and Stoneville 5458B2F are know n to have partial resistance and/or improved tolerance. Results from previous studies are available at the following link (http://lubbock.tamu.edu/cotton/pdf/2009RootKnotNematode.pdf). Symptoms associated with root-knot damage include stunting, poor vigor, yellowing of leaves, and wilting, which may be confused with a nutrient disorder or deficiency. One characteristic that can be used to identify root-knot nematode is the formation of small galls that form on the root.

Symptoms of Root-knot nematode on cotton roots

The amount of damage observed in the field is more severe when there are higher populations of the nematode in the soil. Nematode damage is often enhanced when plants are experiencing other early season stresses. Temik 15G is recommended at planting for fields with moderate or high risk level. Seed applied nematicides such as Avicta and Aeris are also labeled, but have been shown to be most effective under low nematode pressure. The pending loss of Temik means that variety selection will have a large impact on nematode management. Research

efforts will continue to focus on screening varieties and identifying options that can be integrated together to manage the nematode.

A severe outbreak of Bacterial blight (caused by Xanthomonas campestris pv. malvacearum) was observed in portions of the mid-south and sporadic reports were made in Texas. Cotton plants are susceptible to infection at all developmental stages. Stand losses and reduced vigor can be experienced if infections occur during the seedling stage. Symptoms include small, dark green, water-soaked spots that are first visible on the underside of leaves.

Water-soaked lesions caused by Bacterial blight

These lesions, which have an angular appearance and are delimited by the veins, later become present on the upper leaf surface. As the disease progresses, a second leaf symptom (referred to as 'Black arm') can be observed along the main vein. As individual lesions coalesce and become necrotic, infected leaves will defoliate prematurely. In addition, water-soaked lesions can develop on infected bolls. These infections often result in a boll rot. There are no chemical management options available for Bacterial blight. The disease is currently managed through the use of resistant or immune varieties (http://lubbock.tamu.edu/cotton/pdf/2010Bacterial.pdf). Finally, there are a few diseases which are more severe under extremely hot and dry conditions, principally Charcoal rot, which is caused by Macrophomina phaesolina. This pathogen can occasionally be isolated from cotton plants any given year with no potential for yield loss; however, there were several observations made last season where severe damage was observed and yield loss occurred. Plants infected with M. phaesolina may exhibit symptoms similar to

Verticillum or Fusarium wilt, thus assistance in diagnosis may be warranted. To learn see the July 13 issue of FOCUS (http://lubbock.tamu.edu/files/2011/11/July_13.pdf). If you have any questions about any of the cotton diseases, variety selection or seed treatment options, contact Jason Woodward at 806-632-0762 or via e-mail jewoodward@ag.tamu.edu. JW

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