UNIVERSITY OF GEORGIA EXTENSION

UGA Cotton Team Newsletter

July, 2019

Variety Selection in Georgia, Why Our Best Choices are Sometimes a Compromise…(Whitaker)

Weather is a big factor that all cotton producers have to consider during planting season. In Georgia, rainfall is almost always limited at some point and our producers are some of the most experienced in "making it work".

This year was no exception as conditions deteriorated quickly, where rainfall became increasingly rare anywhere across the state between May 14th and June 3rd. On top of the dry weather, air temperatures soared between May 26th and June 3rd. This left conditions exceedingly poor for most of the state and producers who were finishing planting during this time faced an extremely difficult task.

Ultimately, many (if not most) fields which were planted during the window between May 26th and June 3rd ended up having to be replanted.

Replanting occurs on a small percentage of our crop each year, but this situation was unique as stands were inadequate in fields where producers did everything right and used all the tricks and tools we have to help emergence during less than optimum conditions.
Most of the time when a cotton field has to be replanted there is some issue that we can point to which helps explain what happened and give hints to what could be done differently next time.

This time I visited growers across the state with stand issues that occurred during this window and time after time there was not obvious issue that would explain why we failed at getting a stand. The only common thing was that germination seemed to slow down and seedlings seemed to "run out of gas", which was backwards to the common idea that emergence is faster as soil temperatures rise. We did measure soil temperatures in a lot of fields during this window and documented temperatures at 1" below the surface well over 100° F in wet soil and over 120° F in drier soil. We've seen soil temperatures this high many times before, but rarely see it last over a week.

Looking back, there was quite a bit of literature that provided evidence to indicate that cotton emergence slows and is ultimately limited when soil temperatures rise above 95° F. Specifically, that research has shown that temperatures even slightly over 95° F can significantly limit the emergence process. There are several physiological processes that are negatively affected when temperatures rise above 100° F, yet the work ultimately suggests that the seedling emergence process is not efficient and the process slows, in some cases to the point where seedlings don't make it to the soil surface prior to running out of energy (ending in seedling death).

Some of this temperature related cotton seedling work has indicated that seedling vigor, or inherent differences in vigor, can significantly impact how much these adverse conditions play a role in emergence. In Georgia, most of our best variety choices are considered to be extremely small seeded varieties. We know that seed size is very closely correlated to seedling vigor, as seed size decreases, vigor decreases (and vice versa). This is not something that is seed company or brand specific, but rather simply a function of energy storage. So, it should not be surprising that when a larger seeded

variety is planted next to a smaller seeded variety, when conditions are poor, one could see differences in overall emergence.

In hindsight, we had some extremely poor weather conditions for almost half of our planting window and almost impossible conditions during a particular week. Knowing what we know now, there were obvious situations where a bag of seed with better vigor could have made the difference in getting a stand. However, making variety decisions only based on vigor in Georgia could leave yield potential on the table.

With weather predictions becoming increasingly better, we may be able to know when this will happen again. However, we still need to have better information on how seed from a particular bag will respond. Currently, we only know that seed we buy has adequate vigor to emerge in a standard germination test, which is conducted with temperatures up to only 86° F. We can also make inferences based on seed size and in some cases have the results of a cool germination test.

As much as producers pay for cotton seed, I think it's fair to say that we need better information on what happens when soil temperatures rise to risky levels. There are other germination tests out there, specifically an accelerated aging test, which may provide key information needed to help make the decision on how to choose a variety when seedling vigor becomes increasingly important. More times than not, we plant cotton in soil temperatures that are well above 86° F and testing information that reflects that could make all the difference in whether or not we get an adequate stand of cotton in early enough to maximize yields.

This article is certainly not meant to challenge current germination testing procedures or to say that growers should make rash decisions based on recent experiences, but rather to encourage our industry to strive to provide Georgia producers with variety decisions which don't make us settle on sometimes "lower than needed" vigor. In the meantime, we need to work to ensure that we have the best information possible to make good decisions when these scenarios occur again in the future.

After all that, let's hope for a successful 2019 cotton crop. Even though much of the crop suffered early on, the weather has made a turn for the better in most places and with a favorable August we could make an extremely good if not record crop.

For any question or issue with your cotton crop, be sure to reach out to your local UGA County Extension agent.

Considerations for PGRs in 2019 (Freeman)

Although plant growth regulators have been used for many years in Georgia, there is still much confusion about what they actually do. Contrary to what many may think, mepiquat does not cause the plant to produce more flowers or bolls. What is can do is limit the amount of vegetative growth which may enhance fruit retention in lower nodes. This early node fruit retention will help with "earliness" or a quicker maturation of the crop, which tends to benefit later planted cotton more so than early planted cotton. Excessive vegetative growth can also decrease harvest efficiency, decrease coverage of insecticides and fungicides below the canopy, decrease below canopy airflow (which may increase risk of foliar diseases and boll rot), and excessive shading of the lower canopy which can impact the fiber quality of bolls of the lower portion of the plant.

There are several key factors that play a role in a crop's need for PGR applications. Current crop condition should always be the most important factor considered as mepiquat applications to stressed or stunted cotton may have negative impacts on the crop. Checking internode lengths between the 4th and 5th nodes from the top of the plant is a great way to determine the crop's

current condition and growth potential. If this internode measures 3" or greater mepiquat application is warranted.

Other factors should also be considered. What is the vegetative growth history of the particular field? If a field is known for growing rank cotton, higher rates and/or more applications may be necessary. Considerable thought should also be given to the crop's fertility program. If nitrogen is excessive (include all N forms: poultry litter, legume cover crops, standard fertilizer) the vegetative growth potential may also warrant additional mepiquat. Planting date should also be considered, as later planted cotton will often realize a greater benefit from mepiquat applications compared to earlier planted cotton. Additionally, in 2019, special attention should be paid to cotton that was planted in mid to late May. Although not technically "late" this cotton most likely received excessive stress from intense heat, dry weather, and thrips and maturity was most likely delayed. This cotton should be managed as if it were planted late and a more aggressive PGR program should be applied.

One final consideration is cotton variety. Each variety's vegetative growth potential and response to PGR applications is unique. Below is a chart that is to be used as a guide for PGR needs by variety. It is important to understand that although variety plays a large role in the overall PGR program, the other factors must always be considered. For example, a variety in the lower growth potential group will become rank with excessive nitrogen and irrigation/rainfall occur. For me information on rates and timings please contact your local UGA Extension Agent.

Classification		Varieties		PGR Recommendations
1	Varieties with the most vegetative growth potential, require intensive PGR management	DP 1538 B2XF DP 1252 B2RF DP 1553 B2XF ST 5600 B2XF	DP 1555 B2RF DP 1646 B2XF PHY 499 WRF CG 3885 B2XF	Applications - MULTIPLE Initiation - PRIOR TO BLOOM Product – MC (all applications, rates vary)
2	Varieties with similar growth potential of 1st class, yet more responsive to PGRs or earlier in maturity	NG 5007 B2XF PHY 333 WRF PHY 440 W3FE	DP 1747 B2XF ST 6182 GLT ST 6446 GLB2	Applications – MULTIPLE, MOST CASES Initiation – Squaring to 1st Bloom Product - 1st application - Stance or MC - Sequential app. – MC only
3	Varieties may require PGRs, but pre-bloom initiation not typically necessary, could result in premature cutout, esp. in dryland conditions	DP 1840 B3XF DP 1851 B3XF DP 1518 B2XF DP 1522 B2XF ST 5471 GLTP NG 5711 B3XF	ST 5020 GLT ST 5115 GLT PHY 444 WRF PHY 580 W3FE PHY 430 W3FE	Applications – ONE to MULTIPLE Initiation - Bloom initiation likely sufficient Product- 1st app (Stance or MC, low rates) - seq. applications - Stance or MC
4	Varieties that may need no PGR applications, or almost always not applied prior to bloom	PHY 480 W3FE	ST 5818 GLT	Application – NONE to ONE Initiation - Bloom initiation almost always Product – Stance or MC (↓rates)

Layby Directed and Hooded Row Middle Applications of Engenia, FeXapan, and XtendiMax Approved for Georgia Cotton Growers. (Culpepper, UGA & Gray, GDA)

A state Section 24(c) Special Local Need Label has been approved by the U.S. EPA and Georgia Department of Agriculture (GDA) allowing directed and hooded applications for Engenia, FeXapan, and XtendiMax.

Topical applications of Engenia, FeXapan, and XtendiMax in tolerant cotton can only be made through 60 days after planting; thus, directed labels will offer an extended use of this herbicide chemistry. Directed applications should provide improved weed control through better coverage and, even more importantly, will offer a more effective resistance management approach when managing

Palmer amaranth as tank mixtures with more effective herbicides such as diuron may be used. One must have the label in hand and follow it precisely. Below are a few details form the label.

Label Information:

1. Applicators must have attended (and registered) a 2019 Using Pesticide Wisely training and must be a certified applicator.

2. Each applicator must have the label of the product they decide to use in hand during the application. Labels can be obtained at the GDA web site: http://agr.georgia.gov/24c.aspx. Once on the website, click "go to dicamba page"; then select the "24C label" for the product of choice. These labels will provide detailed information needed to make a proper application.

3. Hooded applications: May use any standard spray tip as long as droplets are coarse or larger in size (>341 microns vmd). Hoods must remain in contact with soil while making the application. A maximum of 6 mph sprayer speed. Tolerant cotton must be at least 15 inches in height at time of application.

4. Directed Layby applications: May use any standard spray tip as long as droplets are coarse or larger in size (>341 microns vmd). Spray release point must not be more than 10 inches from the soil and the cotton must be at least 20 inches in height. Spray tip must be angled downward toward the soil making sure no spray droplets remain in the air. A maximum of 6 mph sprayer speed is required.

5. Engenia, FeXapan, and XtendiMax can be mixed with any other labeled cotton herbicides approved on the manufactures websites (www.engeniatankmix.com; www.xtendimaxapplicationrequirements.com; www.fexapanapplicationrequiremetns.dupont.com). Do not mix with AMS or glufosinate products (Liberty, etc.)

A few questions and answers:

1. *Do hood or layby applications reduce the buffer requirements currently required for topical applications?* NO!

2. *Do hood or layby applications increase the application window for these dicamba formulations?* Yes. Hooded or directed applications can be made in-crop up until 7 days pre-harvest for cotton.

First Bloom is Here; Don't Miss Opportunity to Protect the Crop and Maximize Yields (Kemerait)

Three foliar diseases are expected to affect cotton production in Georgia this year and all of them may become more apparent in July. One of them, Stemphylium leaf spot, is likely to be more problematic when hot and dry conditions have prevailed at some point earlier in the season. Target spot is likely to be problematic in fields with good growth and good yield potential and where conditions are warm and humid. Areolate mildew typically appears during the second half of the growing season and, like target spot, is favored by rainfall and humidity.

It is important to be able to differentiate these diseases of cotton because effective management options are different. Stemphylium leaf spot is associated with a deficiency in potassium in the cotton plant. This deficiency may occur because the soil is deficient in potassium or because the roots have not been able to translocate sufficient potassium from the soil. This could be the result of drought where water was not available to move the potassium into the plant, or it may occur in areas where plant-parasitic nematodes have damaged the roots and inhibited nutrient uptake. Severe symptoms of Stemphylium leaf spot often occur in the sandier areas of a field, whether because nutrients are more easily leached from those areas, because drought is felt more intensely there, or because sting and root-knot nematodes are more commonly found in sandier areas of a field. Plants affected by Stemphylium leaf spot show poor growth and significant reddening and yellowing in the foliage. Spots are found on leaves throughout the canopy, and especially at the top of the plant. Centers of

the spots are papery and bleached-gray; often having a "shot-hole" appearance. As Stemphylium leaf spot is the result of a potassium deficiency, fungicides are generally ineffective in managing this disease.

Target spot, caused by the fungal pathogen *Corynespora cassiicola*, is a disease of cotton when the crop has a dense canopy of leaves and high yield potential. Target spot is especially problematic where there are extended periods of leaf wetness, either because of frequent rain showers or where a dense leaf canopy and high humidity reduce airflow and keep leaves in the lower part of the plant from drying. Target spot can also be a problem in fields with excess nitrogen. Target spot is rarely found on poor-growth cotton or where Stemphylium leaf spot occurs. Target spot begins deep in the lower leaf canopy and can move quickly up the plants causing significant premature defoliation when conditions are favorable. The development of target spot is quite variable as it is largely driven by a disease-favorable environment. The first week of bloom is an excellent time to begin scouting for target spot, as first bloom often corresponds with a time when the canopy is closing.

Judicious use of fungicides can help to protect yield and maximize profit for growers. As target spot may not appear in every field every year and, therefore, not all fields will need to be treated. However, where conditions are favorable and target spot appears early enough in the season, growers can increase their yield by 200 lb lint/A, or more, with use of fungicides. Growers should consider use of a fungicide for management of target spot as early as the first week of bloom. However, if the disease is not present, growers can safely delay application if they are willing to scout for onset of the disease. The single most important timing for application is the 3rd week of bloom; multiple fungicide applications may be necessary to protect the crop and yield. The most effective fungicide to date is Priaxor. Headline and Quadris are effective as well. Target spot is nearly impossible to manage once significant defoliation occurs. Growers should not need to protect their crop after the 6th week of bloom.

Prior to the 2017 growing season, I rarely observed areolate mildew (*Ramularia*) except later in the season in southeastern Georgia. In both 2017 and 2018 this disease was observed in cotton across the Coastal Plain and did, I believe, because some yield loss. This is based on results of field trials conducted by Stephanie Hollifield (Brooks Co. Extension Agent) and Jeremy Kichler (Colquitt Co. Extension Agent). Basically, if areolate mildew appears within 4 weeks of anticipated defoliation, I wouldn't worry about it. If areolate mildew shows up earlier, and the cotton crop looks to have reasonable yield potential, I would protect it with a fungicide. If the disease is not detected until significant defoliation has occurred, then there is little chance of protecting yield with a too-late-applied fungicide.

Areolate mildew is easier to control than is target spot. This is because the fungus is much more exposed (it looks a lot like powdery mildew) to the fungicide and because it is less confined to the lower canopy. Use of Priaxor will protect the crop against target spot and areolate mildew, as will Headline and Quadris. Arolate mildew alone can be managed with timely applications of any of these fungicides; however azoxystrobin has been generally effective to date.

Because of crop development, it is important during July to consider protecting a cotton crop with fungicides. There are 5 steps. First, scout the field and determine what diseases are present. Second, decide on management options. If the disease is Stemphylium leaf spot, then a fungicide will not control the disease. If the disease is target spot or areolate mildew, then a fungicide could be beneficial. Third, consider the crop before applying the fungicide. Does the field have a reasonable chance for good yields? How advanced is the disease? Fourth, decide on a fungicide. Priaxor is the best fungicide for management of target spot, though other fungicides, to include Headline and Quadris are also good. These fungicides will control areolate mildew as well, though areolate mildew

is easier to control than is target spot. Fifth, timing of fungicide application is critical. If applied too late, there will be little hope for controlling the disease and protecting yield.

Cotton Aphid Management- We Need the FUNGUS! (Roberts)

Cotton aphid is a fairly consistent and predictable pest of cotton in Georgia. Aphids will typically build to moderate to high numbers and eventually crash due to a naturally occurring fungus, *Neozygites fresenii*. This fungal epizootic typically occurs in late June or early July depending on location. Once the aphid fungus is detected in a field (gray fuzzy aphid cadavers) we would expect the aphid population to crash within a week. **Over the weekend we received several reports of fields crashing due to the fungus in the southernmost Georgia**. Typically the fungus starts in the southernmost counties of southwest Georgia and moves north and east in time.

Aphids feed on plant juices and secrete large amounts of "honeydew", a sugary liquid. The loss of moisture and nutrients by the plants has an adverse effect on growth and development. This stress factor can be reduced with the use of an aphid insecticide. However, research conducted in Georgia fails to consistently demonstrate a positive yield response to controlling aphids. Invariably, some fields probably would benefit from controlling aphids during some years. Prior to treatment, be sure there is no indication of the naturally occurring fungus in the field or immediate vicinity. Also consider the levels of stress plants are under, vigorous and healthy plants are able to tolerate more aphid damage than stressed plants.

A closer look at a cotton aphid infested leaves and identification of the cotton aphid fungus (*Neozygites fresenii*) and other interesting things:

Figure 1. Cotton aphid fungus present and aphids are crashing. Note the gray fuzzy aphids which is indicative of the fungus. Also note the aphid cast skins which are white in color; aphids molt or shed their exoskeleton (skin) as they grow.

Figure 2. Zoomed in on a fungus killed winged aphid. See the fungal growth and sporulation.

Figure 3. No fungus in this infested terminal. The brown balls (aphid mummies) are aphids which have been parasitized by a small wasps. Also lots of aphid cast skins in this pic.

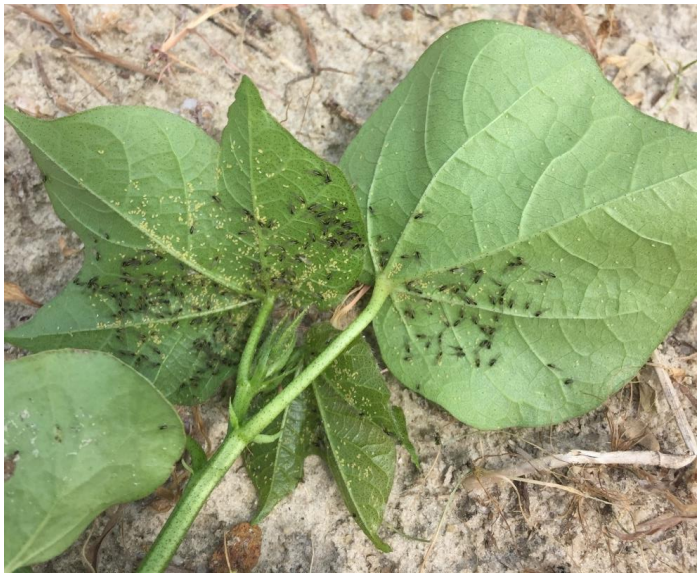

Figure 4. Four leaf cotton with a heavy aphid infestation. Note the high number of winged aphids which invaded this field. If aphids slow seedling growth that may delay maturity which could be an issue on late planted cotton. No fungal infected aphids in this pic.

Stink Bug Update: Observations and correspondence with agents, scouts, and consultants suggest that stink bug numbers are higher than we have observed in recent years. Once plants begin setting bolls begin monitoring for internal damage. Scout bolls approximately the diameter of a quarter. Bolls of this size are easy to squash between your thumb and forefinger and are the preferred size for stink bugs to feed. Bolls with callous growths (warts) and/or stained lint are considered damaged. Use the dynamic threshold based on week of bloom to make treatment decisions. During the first week or ten days of bloom when bolls have not reached the size of a quarter, sample the largest bolls available. Stink bugs will feed on small bolls when 10-12 day old bolls (quarter sized) are not present. Feeding on small bolls will cause them to be shed by the plant.

Important Dates

Expo Field Day – July 25th
Midville Field Day – August 14th