UNIVERSITY OF GEORGIA EXTENSION

UGA Cotton Team Newsletter
May 2022

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Early Season Growth and Canopy Development (*John Snider, Gurpreet Virk, Ved Parkash, and Camp Hand*): The previous newsletter covered the different processes occurring during germination and emergence and some important factors affecting stand establishment. Post-emergence, cotton is well-known to have poor seedling vigor compared to other major row crops such as peanuts, corn, and soybean. One of the main reasons for slow early season growth is that cotton has smaller sized seeds with fewer energy reserves compared to the aforementioned crops. Another reason is that true leaves must develop after emergence from an undifferentiated region called the epicotyl, whereas some other crops have their first true leaves present at emergence. Another cause of slow early season shoot growth is higher plant investment in root growth during early development. For example, by the time the cotyledons have unfolded, the tap root may be up to 10 inches deep, and root growth will continue rapidly until flowering. At the onset of flowering, the plant redirects more of its resources to boll production, drastically slowing or even halting root growth altogether. Similar to germination and emergence, early season growth temperatures also impact root growth and early season canopy development. Therefore, it is important to minimize stress in the early season to maximize root growth and promote vigorous canopy development. Figure 1 (A) shows the effect of two different day night temperature regimes- optimal (86/68 °F) and suboptimal (68/59 °F), on root and shoot growth in cotton. Sub-optimal growth conditions can result in reduced root growth along with substantial inhibition of leaf area development. Figure 1 (B) below shows the relationship between average leaf area per plant and total root length per plant at two weeks after planting. Healthy roots are positively associated with healthy shoots.

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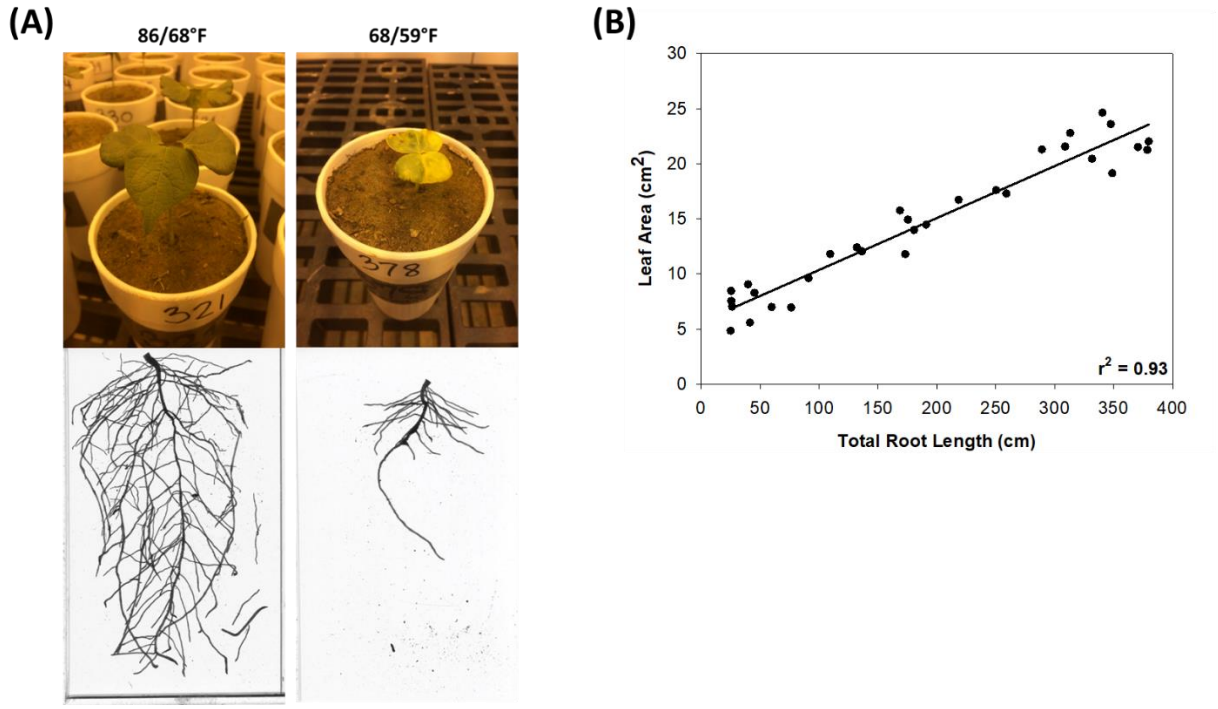

Figure 1. Effect of growth temperature on root and shoot growth in cotton seedlings. (A) provides images showing two-week-old roots and shoots under optimal (86/68 °F) or suboptimal (68/59 °F) temperature conditions, and (B) shows the relationship between average leaf area per plant and total root length per plant at two weeks after planting.

Canopy Development: Rapid true leaf differentiation is an important factor affecting growth and vigor in cotton. The crop requires approximately 50 DD60s for emergence and another 50 to produce its first true leaf and each mainstem leaf thereafter. The cotton plant begins producing branches at approximately the fifth node above the cotyledons, and there are two types of branches: monopodial (vegetative branch) and sympodial (reproductive branch). At approximately the sixth mainstem node (plus or minus one), the plant will produce its first fruiting branch (usually after having produced one or more vegetative branches), and the first square will be visible on the first fruiting branch at approximately 35 days after planting, but even the timing of squaring depends on the initial rate of node development, which (as we've noted previously) is temperature dependent. Each fruiting branch will add additional fruiting sites at positions further away from the mainstem and new fruiting branches will continue to be produced at newly-generated nodes above the first fruiting branch. Furthermore, each fruiting site on a fruiting branch will have a subtending leaf associated with it.

Due to its indeterminate growth habit, the development of leaf area and fruiting sites in cotton are inextricably linked with sympodial leaves accounting for a larger percentage of total leaf area as the season progresses. Leaf area development of the cotton crop follows a sigmoidal growth response, with a slow increase in leaf area during first 6 to 7 weeks after planting (lag phase) and rapid leaf area development during the early fruiting stage (exponential growth phase), eventually resulting in canopy closure at

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approximately 75 days after planting if development proceeds normally. Vigorous vegetative growth prior to flowering will increase the number of fruiting sites available to set bolls, and because each fruiting site has a leaf associated with it, the rate of new fruiting branch development can partially determine the timing of canopy closure which is important for maximizing light interception for whole-canopy photosynthesis. The number of mainstem nodes above a first position white flower (NAWF) at first flower can be indicative of stress or excessive vegetative growth requiring application of plant growth regulators (PGRs). Values ranging from 9 to 12 squaring nodes above a first position white flower are indicative of ideal to vigorous vegetative growth. While fewer squaring nodes could potentially be indicative of stress (water, nutrients, etc.), yield is a function of the number of fruiting sites produced and the rate of fruit retention, so acceptable yields can also be achieved with fewer nodes, provided fruit retention is high. Thus, during the pre-flowering phase of canopy development it is important to maximize canopy growth by 1) obtaining acceptable stands (see previous or current newsletter articles dedicated to planting considerations and control of seedling diseases), 2) minimizing abiotic stresses such as water deficit or nutrient stress (see newsletter articles addressing early season fertility and irrigation), and controlling weed and insect pests that are most common during this phase of development. Once flowering begins, crop monitoring and growth management decisions become critical to ensuring an acceptable balance between vegetative and reproductive growth.

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Herbicides and Dusting in Cotton can be a Mighty Challenge! (*Stanley Culpepper*): *It seems most years, we are extremely dry at some point during planting which challenges our herbicide decisions. Below is an article provided last year that I am resharing without changes as our research continues to support this discussion.*

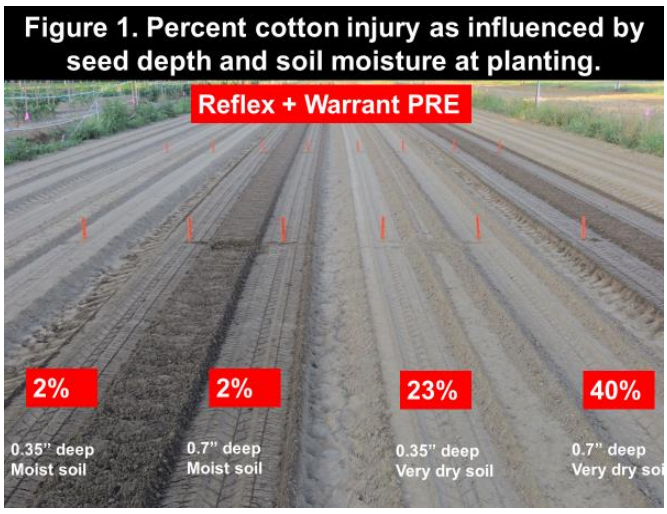

Figure 1. Percent cotton injury as influenced by seed depth and soil moisture at planting.

The most effective approach to minimize cotton injury from preemergence (PRE) herbicides is to place the cotton seed in moist soil where it can imbibe (absorb) clean water free of herbicides (Figure 1). Next, we need our cotton roots to "out run" the herbicide as the herbicide is moving down into the soil with rainfall or

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irrigation. When placing cotton seed in dry soil and then applying a PRE herbicide, it is likely impossible for water to get to the seed without being contaminated with the herbicide causing a much greater potential for injury.

Thus, dusting cotton in and applying PRE herbicides is far from ideal in regards to avoiding cotton injury. The next thought from every grower is to hold off on the herbicides until the cotton emerges. This thought is extremely dangerous when considering the monumental challenges our family farms face with herbicide resistance in Palmer amaranth. However, it may be the only option in some environments. If one does follow the path of not using PRE herbicides and planting cotton into dry soils, there are several key points to consider.

First, there needs to be no weeds emerged (especially Palmer) when the cotton seed is placed in dry soil. If there is, get the backhoe out to dig the Palmer up later in the year. In theory, if the field is weed-free when dusting cotton in the soil then no additional weeds should emerge until it rains.

Second, the first postemergence herbicide application should occur as soon as the cotton is fully emerged; the treatment must kill emerged weeds and must include residual herbicides. The level of selection pressure placed on the postemergence herbicide in this situation is very high and not sustainable in time.

Third, a second postemergence herbicide application should be made 12 to 15 days later and again include a residual product, this timing assumes you were timely with the first postemergence application. If you were not timely, the interval needs to be shortened following label recommendations.

And finally, the value of the layby application in fields without a PRE increases astronomically in regards to herbicide sustainability. Although it is time consuming, it is still better than pulling pigweed!

In-field Planter Considerations (*Simer Virk and Wes Porter*): As cotton planting ramps up across the state, it is important to re-emphasize the value of proper planter setup and operation to attain a timely and uniform stand establishment. The previous newsletter article on planter preparation covered key points on planter inspection and maintenance that could be performed before heading out to the field. While it provided a good opportunity to prepare for planting, an important aspect of ensuring good planter performance is regular in-field checks and adjustments to different planter components as needed for the prevalent field conditions. Planter issues are common during planting but can be mostly avoided by paying attention to the planter operation and catching issues before or as they occur in the field. Here are few additional considerations to keep in mind while planting cotton to minimize or prevent any potential planter related issues in the field:

- First and foremost, if you haven't started planting cotton yet, there is still time to **perform a thorough planter inspection** using the checklist available here Planter Checklist (UGA). Remember to take care of any major issues or parts that needs to be replaced before getting out in the field and plant.

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Neglecting minor issues now can result in greater downtime and/or major problems later in the season.

- If you are already out in the field planting cotton, make sure to **get out and dig behind the planter** to ensure that the desired seeding rate (seeds per foot), seed depth, and seed-to-soil contact are attained across every row. Seeding rate and/or depth variability is very common among the row-units on the same planter so checking each row is important to have a uniform stand across the field.

- Variability in planting conditions within the same field or among the fields is again common and will require **adjustment to planter settings based on the existing conditions**, with special consideration to variability in soil texture, moisture, and/or crop residue. A change in cotton variety, specifically seed size, would also require adjustments to vacuum and seed meter settings to ensure good seed singulation with minimal skips or doubles.

- When you notice any seed singulation, spacing, or depth issues in the field while planting, make sure to **properly identify and fix planter issues before continuing to plant** across the whole field with the same planter. It doesn't take long for small seed metering or spacing issues to translate into much bigger emergence problems later.

- Always keep a **consistent visual on important planting parameters** including vacuum pressure, row-unit bounce, operation of row-cleaners, gauge-wheels and closing wheels from the tractor cab during planting. Minor planter issues – which can affect seed placement and emergence – during planting are often the hardest to catch and often go unnoticed until they become a problem. The last place you want to identify a problem is after emergence.

- When using a seed monitor or any other advanced planting technology such electric seed meter drives or active downforce, **pay attention to the planting feedback for each row** instead of looking at the overall population and other averaged planting metrics. Planting issues are usually not consistent across the whole planter but more specific to individual row units so they are easy to identify and fix when viewing by-row feedback.

Weather and Climate Outlook for May 2022 and Beyond (*Pam Knox*): April 2022 was a mixed bag climate-wise, with some areas in central Georgia receiving a lot of rain while others missed out. This led to dry conditions in some parts of the state that have farmers there worried. Temperatures in the northern ¾ of Georgia were cooler than normal overall, while farmers in southern Georgia experienced conditions that

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were a bit warmer than normal. As a result of the variable rainfall and warmer than average temperature, moderate drought and abnormally dry conditions cover a quite a bit of South Georgia as of the beginning of May.

The climate prediction for May shows a continuing trend towards warmer than normal temperatures across the state, but especially along the southeastern coastal plain. This is due both to the continuing trend towards warmer temperatures we see worldwide and the surprising continuation of La Niña into a third year. The prediction for May's precipitation from NOAA's Climate Prediction Center shows us in equal chances of lower, near, and above normal rainfall for May. This is not surprising since our current weather state puts us in a summertime pattern, with daily thunderstorms (and some occasional severe weather) dropping rain in some places while it misses others, so large-scale rainfall patterns are hard to forecast. Because of that, the drought conditions are predicted to continue through May, although they may disappear later in summer once the tropical season kicks in.

The Atlantic tropical season officially begins on June 1. The predictions this year are for another active season due to the continuing influence of La Niña, which tends to suppress the jet stream which might otherwise keep tropical waves developing into storms or hurricanes. Of course, the predictions only cover the number of named storms per year, so we cannot say at this point if they will bring rain to the Southeast or if they will move over Texas or up the East Coast this year. Tropical rainfall is an important part of the water cycle in summer in the Southeast, so we hope that at least some tropical moisture will come over the summer. It is not too early to think about tropical storms, since for most of the last few years we have at least one named storm before the official start of the tropical season. The long-range models are already suggesting that we may get at least one storm in mid-May off the East Coast, although it may not bring much rain to most of the Southeast. Now is the time to prepare for hurricane weather, since the season will be on us before you know it.

The current La Niña has been surprisingly strong this year, and for now we don't see an end. Only a couple of La Niñas since 1950 have lasted for three years, so this makes it more difficult to predict what effects it might have on climate conditions. For now, our best bet is to consider this just another La Niña summer, with limited effects on temperature and rainfall during the growing season and the biggest impact on the tropics.

If you are one of the areas that are experiencing dry conditions, you may wish to report those conditions to let the National Drought Monitor authors know so they can incorporate your reports into the national drought map. I have posted instructions for how to report to the Condition Monitoring Report site at https://site.extension.uga.edu/climate/2022/04/how-to-report-dry-conditions/.

Early Season Irrigation Requirements for Cotton Production (*Wes Porter, David Hall, and Jason Mallard*): While every year brings something different we must keep an eye on the weather, soil moisture conditions, and future forecast and make necessary adjustments. While other areas of the country are struggling to plant due to excessive rainfall and moisture, we have not had a significant rainfall in southern Georgia since mid-April (around Easter). While, it can change, and you cannot put too much faith in a 10+

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day forecast, currently the long-term forecast is for us to remain dry with less than a 30% chance of rain until mid-May. Temperatures are expected to reach the 90's during the first week of May. Knowing this, we need to plan for planting into dry conditions and should plan to apply a small amount of irrigation prior to planting if possible in irrigated fields.

Most of the cotton across Georgia should be planted during early- to mid- May. Similar to peanut, cotton does not require very much irrigation during the first month or so of growth and in some cases if adequate rainfall is received cotton can go up to squaring and even bloom without additional irrigation applications as exhibited by the red box and water use curve below in Figure 1. UGA Extension has developed an Irrigation Reference Guide for Corn, Cotton, Peanuts, and Soybeans | UGA Cooperative Extension, a quick and easy irrigation scheduling guide that is laminated and contains the four major row crops grown in Georgia. However, if it gets hot and dry again like it did during late May and early June of 2021 you may need to apply a few small irrigation applications either weekly or potentially a few times per week. The red box below represents cotton water requirements the first five weeks after planting. Keep a track of rainfall and temperature, your irrigation efficiency (typically around 65-70% for high pressure systems and 80-90% for low pressure systems), and make irrigation applications accordingly. Keep in mind that the water requirement below is irrigation plus rainfall, and the weekly water requirement recommendation was developed based on a historical average evapotranspiration. Thus, your actual water/irrigation requirement may vary slightly based on weather conditions and rainfall during the growing season. As stated above, this year is shaping up to be hot and dry, so keep that in mind during the early part of the cotton season. For a more in-depth irrigation recommendation it is suggested that you look into implementing either a computer scheduling model either online or via a Smartphone App, or soil moisture sensors.

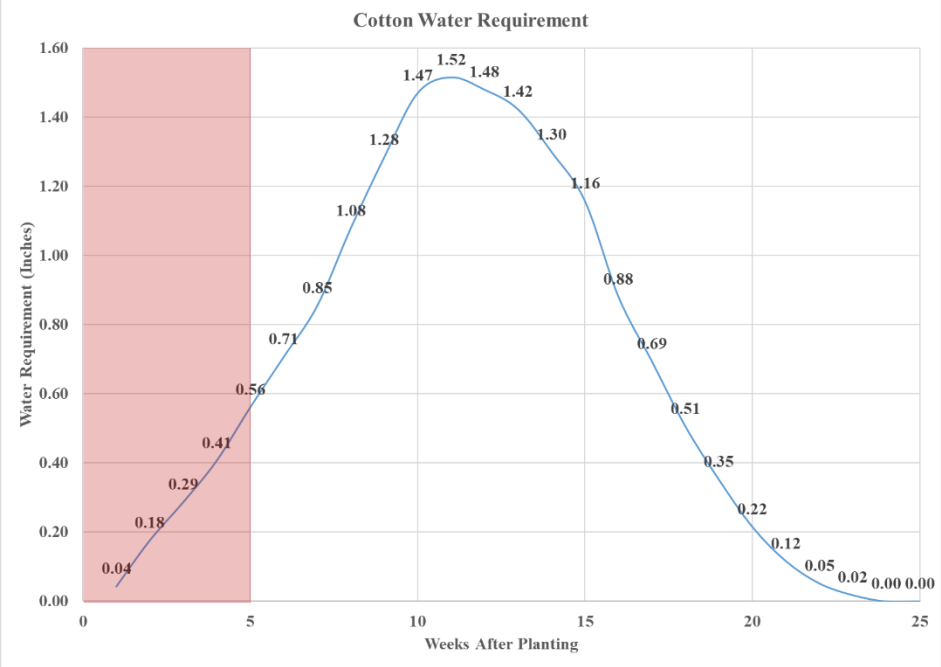

Figure 1. Seasonal Cotton Water Requirement.

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For cotton farmers who utilize tools such as soil moisture sensors in their irrigation scheduling, there are a few quick reminders to keep in mind. We tend to visualize the above ground plant biomass and forget what is growing below the surface. We can sometimes be guilty of placing a sensor in the row of the cotton let it start logging data, making decisions from that data and assuming everything is good to go. Unfortunately, we need to ensure we know what is going on in the field before we blindly start following the sensor. Based on when you planted certain fields cotton may be spread in age by several weeks while some is still in the bag, this is a good time to think about "weighting sensor depths" according to rooting depths.

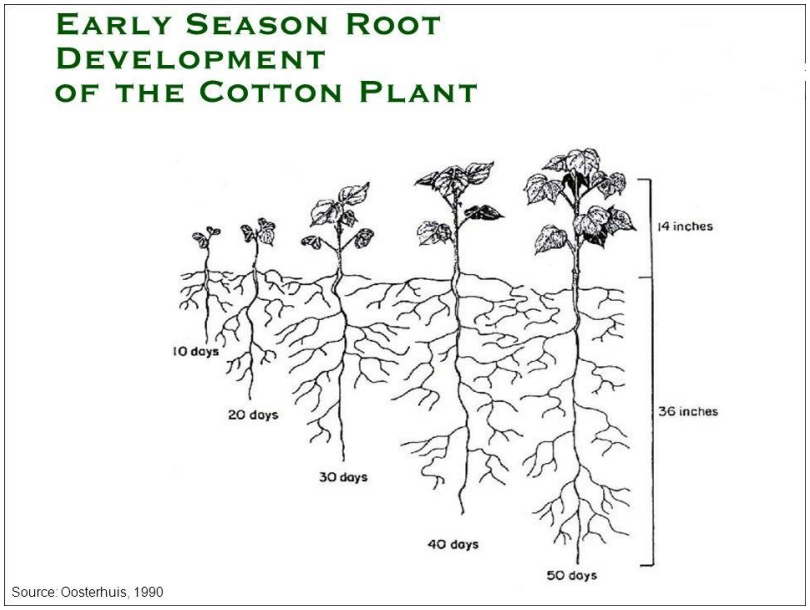

Figure 2. Visual development of root development as the cotton plant progresses in age.

One thing is certain in farming, one year from the next is never the same. Weather and available moisture are constant variables. Adding rooting depths and plant needs in the equation creates the need for a formula for weighting sensor depths in your irrigation scheduling decision, an important factor throughout the growing season. Most sensors come with two or three depths that measure available moisture. Early in the season, we generally have cool nights and afternoon temps are "normally" around the low to mid 80s. The evaporation rate is low in comparison to the dry hot summer days and nights. The root profile for the first month develops fairly shallow in the soil. These combinations of events reflect the plant water needs, as shown in our UGA Checkbook method. Moisture sensors generally default to an average of using sensors available on the probe for a trigger decision. This can provide false water needs for young cotton plants. For example, if a 16" depth is showing a dry reading and the 8" sensor is reading adequate moisture, the average will possibly trigger an irrigation event. If a cotton plant has just fully emerged and your root profile is in the 8"-10" range in this scenario, you actually do not need to irrigate. Now, considering the rooting depth let's weight the 8" sensor by an 80% value and the 16" sensor by 20%. Now since the average is weighted higher on the shallow sensor it can be seen that irrigation may not be needed. You should not begin to fully use deeper sensors for irrigation scheduling decisions until you see what water use is occurring at those depths. Weighting moisture sensors can be very beneficial but can be harmful if

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adjustments are not made during the growing season. If you are interested in weighting sensors, below are UGA Extension suggestions to consider for weighting sensors during the growing season:

D1 = shallow sensor D2 = middle sensor D3 = deepest sensor

- Early-Season: 80% * D1, 20% * D2, 0% * D3
- Early-Mid Season: 60% * D1, 30% * D2, 10% * D3
- Mid-Season: 50% * D1, 25% * D2, 25% * D3
- Late-Season: 40% * D1, 30% * D2, 30% * D3

Soil moisture sensors provide the most accurate means of monitoring available soil moisture. Monitoring the root zone and available moisture present is a great tool in irrigation scheduling. If you have further questions about irrigation scheduling on your cotton reach out to your local UGA County Extension Agent.

General Thoughts and Last-Minute Decisions (*Camp Hand*): As we enter what is supposed to be full swing for cotton planting, I have a few thoughts and considerations to take into account regarding the situation we are currently in.

The first thought I have is that I am praying for a rain for our growers across the state. We have gotten pretty dry in a hurry as a whole, and many conversations that I am currently having with folks go something like this: "How's things your way?" "Just hoping for some rain!" Luckily, over the past few days pop-up showers have given some folks what they need to start or continue planting. However, others have not been quite as fortunate.

We need to keep in mind that we are still very early in our window for planting cotton and that now is not the time to press the panic button just yet. Although I would much rather spread out our planting dates, thus spreading out our risk, if we get backed into a corner and have to plant our crop in a hurry (particular for dryland situations) we can make it work. It wouldn't be the first time, and won't be the last.

Other conversations I have been having are around some supply issues with seed. For one reason or another, growers might not be able to get the variety they wanted. It's important to know that along with the general supply chain snags we are facing with everything else under the sun, 2021 was generally a bad seed production year for the western part of the cotton belt which is part of what we are dealing with now.
Although the variety you want may not be available, there are resources available to help you find a replacement. Throughout the meeting season this past winter, many of you heard me talk about the on-farm variety trials and those results. Just as a reminder, those results can be found here. Historically, these varieties have represented roughly 75% of the planted acres in our state. With that being said, your preferred variety might be on this list and might be affected by some of these supply issues mentioned above.

Another extremely valuable resource to use if you are trying to make a decision on a variety that you aren't familiar with and isn't included in the on-farm variety trial is the Statewide Variety Trial, commonly referred to as the OVTs. These trials evaluate far more varieties than I ever could on a grower's farm, and provides a relative evaluation of variety performance in six different environments. The OVT results can be found here.

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If you have last second questions about varieties, or anything else for that matter, don't hesitate to reach out to your local UGA County Extension Agent. They, along with myself and the rest of the cotton team, are here to help.

Early Season Disease and Nematode Update (*Bob Kemerait*): The peak of cotton planting is upon us and cotton growers are reminded that careful decisions made now are critical to protecting the crop and yield potential for the rest of the season. Nematodes, especially root-knot, reniform, and sting, can cause serious damage to a cotton crop. The best, and sometimes the only, management options are spent once the furrow is closed. Where root-knot and/or reniform nematodes are an issue, growers are reminded that they can plant nematode-resistant varieties. Planting resistant varieties will protect the plants from damage without the use of nematicides and will also help to reduce growth of nematode populations that will affect the cotton crop next season.

Growers who choose not to plant nematode-resistant varieties, for whatever reason, are encouraged to use nematicides judiciously. No nematicide can provide season-long protection to the cotton crop and certainly will not any effect on nematode populations for next season. (Only planting resistant varieties or rotating away from cotton to a non-host crop will reduce populations for next season.) However, use of an appropriate nematicide at the appropriate rate will allow a cotton plant to get a "head start" and begin to develop a robust root system before the inevitable damage occurs. Protecting that young root system for 4 to 6 weeks early in the season can have lasting benefit on yield and profit.

Below are several key points to getting the most out your investment in use of a nematicide:

1. Know the type of nematodes and the size of the population in your fields. This is best accomplished with samples taken after harvest in the previous season. Some nematodes, such as the ectoparasitic sting nematode, may be an easier target because they stay outside the root and are more exposed to the nematicide. Knowing the population size helps to determine which nematicide, fumigant (Telone II), granular (AgLogic 15G), liquid (Velum), or seed treatment (e.g. AVICTA, Copeo, BIOst, or Trunemco) is likely to best provide the needed protection to the cotton crop.

2. Once the furrow is closed, the only additional option for nematode management available to growers in a foliar application of oxamyl (Vydate-CLV or ReTurn XL) at about the 5th true leaf stage to possibly extend the protective window of nematicides applied at planting.

3. New products are often being made available to cotton growers for management of nematodes. Averland FC nematicide (active ingredient abamectin) is such a product for 2022. As there is very little data available for the efficacy of Averland at this time, growers should use caution before

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whole-scale replacement of products that have proven effective in the past. UGA Extension will have additional data on Averland FC after this season.

4. Nematode problems for corn growers seem to be especially severe in 2022. I suspect that the combination of a warmer "La Niña" winter coupled with corn-behind-corn has led to such problems. Cotton growers should also anticipate increased problems with nematodes in 2022 for similar reasons.

5. Getting the most out of a nematicide requires using the right product at the right rate. It also requires consideration for environmental conditions as well. For example, fumigation with Telone II is affected by soils that are too wet or too dry at time of application and by significant rain events after fumigation. Likewise, granular products such as AgLogic 15G require some soil moisture to be activated and also taken up into the roots.

Though the 2022 cotton season has only just begun, protecting a cotton crop against nematode now will have lasting benefit throughout the season. Growers are encouraged to make the best management decisions now.

When to Spray Thrips (*Phillip Roberts*): Thrips are the most consistent and predictable insect pest of cotton and will infest near 100 percent of cotton planted each year. Thrips are the only insect pest that UGA recommends use of a preventive insecticide as preventive systemic insecticides used at planting provide a consistent yield response to this predictable pest. Decisions to treat other pest should be based on scouting and use of thresholds. At-plant systemic insecticides include AgLogic (aldicarb) applied as a granule infurrow, Admire Pro (imidacloprid) and Orthene (acephate) applied as a liquid infurrow, and neonicotinoid seed treatments (primarily imidacloprid). Acephate can also be used as a seed treatment. In general, aldicarb and the liquid applications of imidacloprid and acephate provide greater and more residual control compared with seed treatments. If thrips populations are high, potentially any of the above-mentioned treatments may need a supplemental foliar spray. However, we would expect seed treatments to require foliar sprays more often than aldicarb or infurrow applications of imidacloprid or acephate.

All fields should be scouted for thrips and thrips injury. Seedlings are most susceptible to thrips during early growth stages (i.e. 1-2 leaf cotton is more susceptible to thrips than 3-4 leaf cotton). Economic damage rarely occurs once seedlings reach the 4-leaf stage and are growing rapidly. Growing rapidly is an important point. Thrips injury will be greater on slow growing seedlings compared to rapidly growing seedlings during any growth stage. Thrips are feeding on unfurled leaves in the terminal. Let's consider a slow growing seedling which unfurls a new true leaf in 6 days and a rapidly growing seedling which unfurls a new true leaf in 3 days. If the same number of thrips were feeding on each plant, injury would be much more severe on the slow growing seedling as thrips feed on that leaf for 6 days compared to only feeding on the new leaf in the rapidly growing seedling for 3 days. To sample thrips simply pull an individual plant and slap against a surface such as a note pad or cigar box to dislodge thrips. Count adult and immature

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thrips on multiple plants in a field. Adult thrips are winged and are most often brown or almost black (these are tobacco thrips). Immature thrips are wingless and cream colored. The threshold for thrips is 2-3 thrips per plant with immatures present. The presence of immatures indicates the at plant insecticide is no longer providing control, thrips eggs laid on the plant, eggs hatched, and thrips are developing. Recommended foliar insecticides for thrips control include Orthene, Bidrin, and dimethoate; pyrethroids will NOT control thrips. It is important that you begin scouting soon after emergence. Remember that early growth stages are much more sensitive to thrips feeding compared with later growth stages. At the latest, you need to be scouting and prepared to react as seedlings begin unfurling the first true leaf. I have seen many times that growers will wait to apply a thrips spray with a POST herbicide. If you have a thrips problem at the 1-leaf stage, it needs to be addressed in a timely manner.

The figures below illustrate within season risk for thrips in Tifton, Waynesboro, and Madison, Georgia. You can generate thrips risk info for your location using the **Thrips Infestation Predictor for Cotton** at the following web site: https://products.climate.ncsu.edu/ag/cottontip/. Thrips risk for most of southwest Georgia is similar for Tifton in that thrips risk is highest on April plantings and begins to decline in May. Note the risk for Waynesboro is greatest during late April and then declines in May. Interestingly, thrips risk in Madison (North Georgia) is greatest during the first three weeks of May. This predictive model does not consider tillage, thrips infestations are significantly lower in reduced tillage systems where residue is on the soil surface. The more residue, the greater the reduction in thrips.

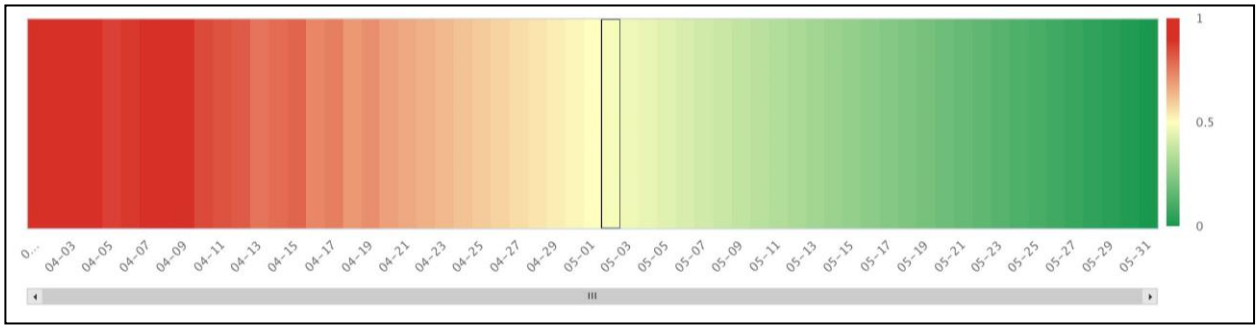

Figure 1. Within-Season Risk for 2022, Tifton, GA

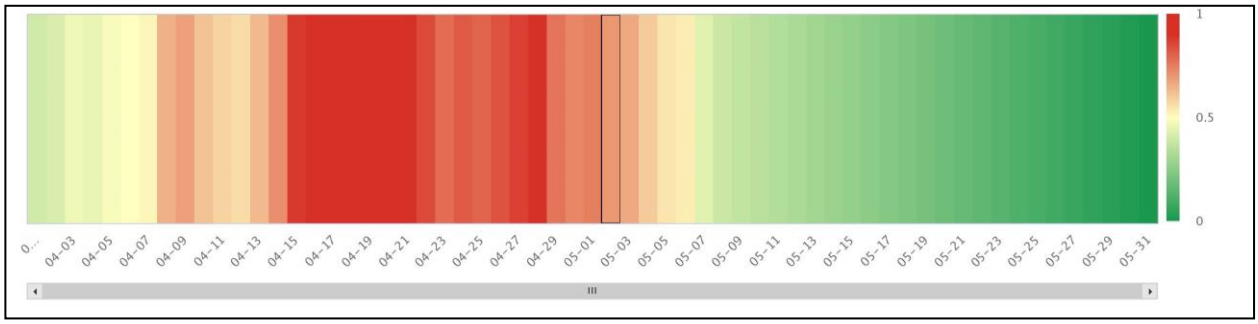

Figure 2. Within-Season Risk for 2022, Waynesboro, GA

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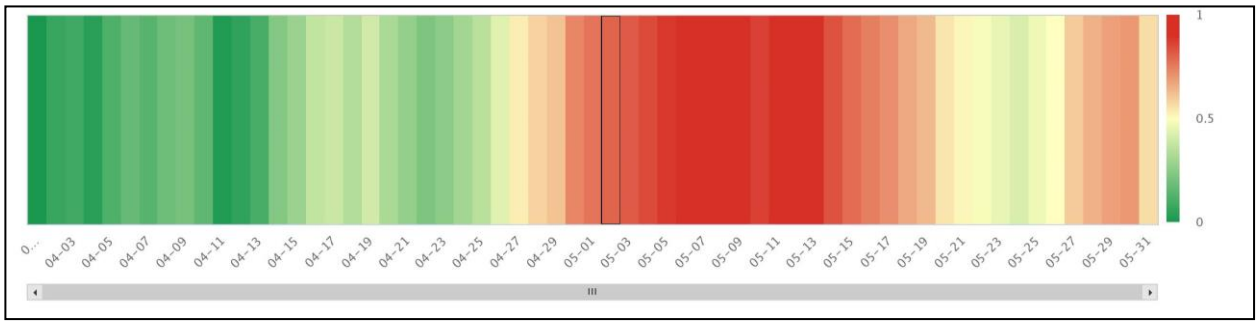
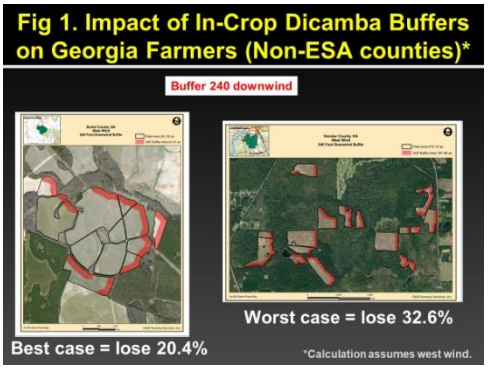
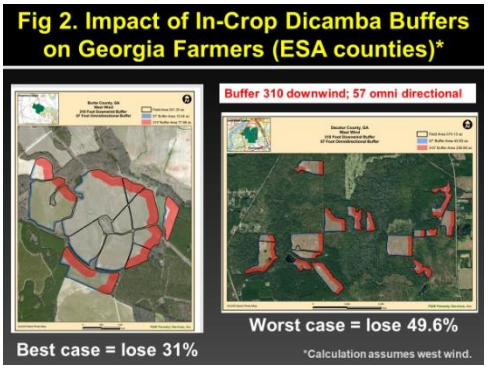


Figure 3. Within-Season Risk for 2022, Madison, GA

Your Weed Management Toolbox is in Trouble; Are You Paying Attention? (*Stanley Culpepper*): The ability to control weeds on our family farms in the future is frightening, at least for those paying attention. If you are one of those reading popular press articles or listening to scientists, then you know weed resistance to herbicides is extremely alarming, removing tools from the toolbox rapidly. Palmer amaranth with resistance to glyphosate, ALS-herbicides (Staple,etc.), atrazine, and the PPO herbicides (Reflex, Valor) has been documented in our state; keep in mind resistance issues in ryegrass are an even greater problem for some! Although the loss of tools to resistance is justifiability alarming and a very serious situation, unfortunately, I am not sure this alone is our greatest challenge.

In fact, I would suggest it is not! The current regulatory atmosphere is equally if not more of a concern and unlike resistance, we have little influence on the decisions being made. In-field buffers placed on dicamba products labeled for use in cotton prohibit their legal application on 20 to 50% of our fields (Figs 1 and 2), and don't forget the court system will likely determine our ability to use these tools in any practical manner over the next 12 months. Enlist Duo is no longer registered in 11 Georgia counties because of the Endangered Species Act (ESA); MSMA is facing serious use limitations due to rotational restrictions; and just last week, the U.S. EPA released details informing us diuron may be removed from our weed management programs (cotton, veggies, and fruit). Diuron is, as you already know, one of the most important herbicides available on a cotton farm today providing excellent weed control, resistance management, and economic sustainability. Make yourself more aware of this situation and be prepared to act





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https://www.epa.gov/pesticides/epa-seeks-public-comment-measures-address-human-health-and-ecological-risks-posed-diuron. Unfortunately, that is not all, glyphosate and atrazine face serious threats especially from the Endangered Species Act, as does most every other pesticide.

Research evaluating alternatives to herbicides is critically important and heavily investigated by weed scientists. Cover crops, tillage, flaming, mowing, mulching, solarization, see and spray technologies, weed electrocution, weed-seed harvesters, and even using radiated pollen to manage weeds all have potential. However, each of these approaches is likely only consistently effective (on large scale) when used in conjunction with herbicides, especially for Georgia farmers as our weed population densities and continual emergence makes our weedy competitors fierce adversaries (Fig 3).

So, what about protecting and hopefully one day expanding our toolbox? Mitigating resistance is the first step, and each farm is in control of this step by making the decision to implement sound diversified management programs in a timely manner. The greater challenge is regulatory. Agriculture must unite to address the loss in the practical use of herbicides (and other pesticides) through cooperative efforts, developing methods to assist regulators by generating sound science to help them make better decisions at a local level. Our farmers and ranchers must also lead the mission of using pesticides wisely and only in ways that are safe for applicators, the environment, wildlife, neighbors, and our consumers!

Important Dates:

Southeast Research and Education Center Field Day – Midville, GA – August 10, 2022
Cotton and Peanut Research Field Day – Tifton, GA – September 7, 2022

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