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UGA Cotton Team Newsletter
April 2023

Articles in this month's issue include:

The Cause of Recent Bank Failures and the Ripple Effect on Cotton Producers (*Serrina Liu*): Since March 2021, inflation has started to soar in the United States, reaching a 40-year high in June 2022 at 9.1%. History and economic theory show that if the central bank doesn't get inflation back in place, that could result in a series of years where inflation is high and volatile. High inflation will cause economic hardship, eroding purchasing power, discouraging capital investment, and melting the economy. Thus, Fed remains strongly committed to returning inflation to the two percent goal. To quell inflation, the Fed hiked interest rates nine times over the last year, raising the Federal Funds Target Rate from 0.25% during the pandemic to 5% since March 22, 2023. Reducing inflation requires interest rates to remain relatively high for a long time. Fed expects the Federal Funds Target Rate to be 5.1% at the end of this year, 4.3% at the end of 2024, and 3.1% at the end of 2025. A high interest rate is likely to require a period of below trend GDP growth in the United States and some softening in labor market conditions.

The fast pace of rate hikes to fight inflation has its economic consequences, including the recent events of bank failures of Signature Bank and the Silicon Valley Bank. These two banks had significant exposure to the technology sector or cryptocurrency, whose business models are more sensitive to interest rate hikes. The ripple effects of 2023 bank failures are too soon to determine. But banking failures will likely result in tighter credit conditions for households and businesses, which would tighten financial conditions in the United States, including slowing down economic outcomes and weighing on labor market demand and inflation.

For cotton producers, what do these mean, and how would these economic events impact them? As discretionary items, the demand for cotton and cotton-related products tends to follow the economy. With the possibility of slowing down the economy, demand for cotton would possibly be on a declining trend,

which would put downward pressure on cotton prices. As shown in Figure 1, since the U.S. Department of Agriculture (USDA) first reported the projection of the total cotton production, demand, and ending stocks for the 2022/2023 crop year, USDA has adjusted the total demand downward each month, reflecting a decline in U.S. cotton demand. Meanwhile, the building up of U.S. ending stocks in each month's projection, especially in recent months, reflects the increased availability of cotton. With lower demand and higher availability, cotton prices are expected to drop. The current USDA price forecast for the 2022/2023 cotton crop is 83.0 cents per pound. This price forecast is before factoring in the recent events of the bank failures, which created a lot more uncertainty for the economy and, thus, resulted in more volatility in cotton prices. In addition, borrowing costs would remain at a relatively high level for an extended period for cotton producers. With the federal funds rate expected to remain relatively high until the end of 2025, cotton producers need sound financial risk management strategies in battling against high borrowing costs.

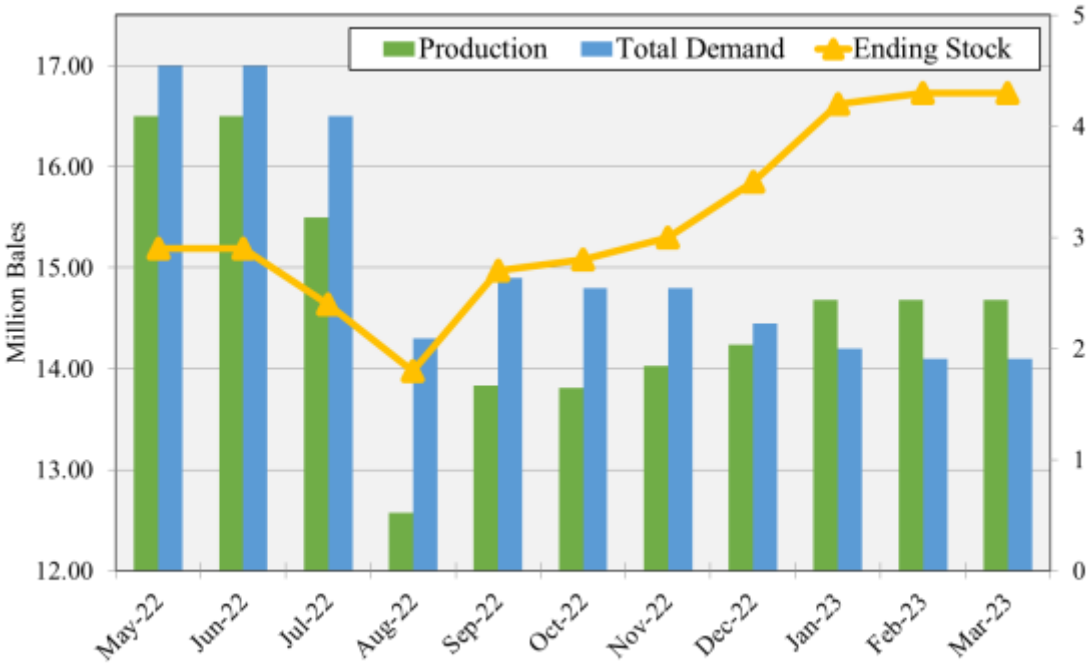
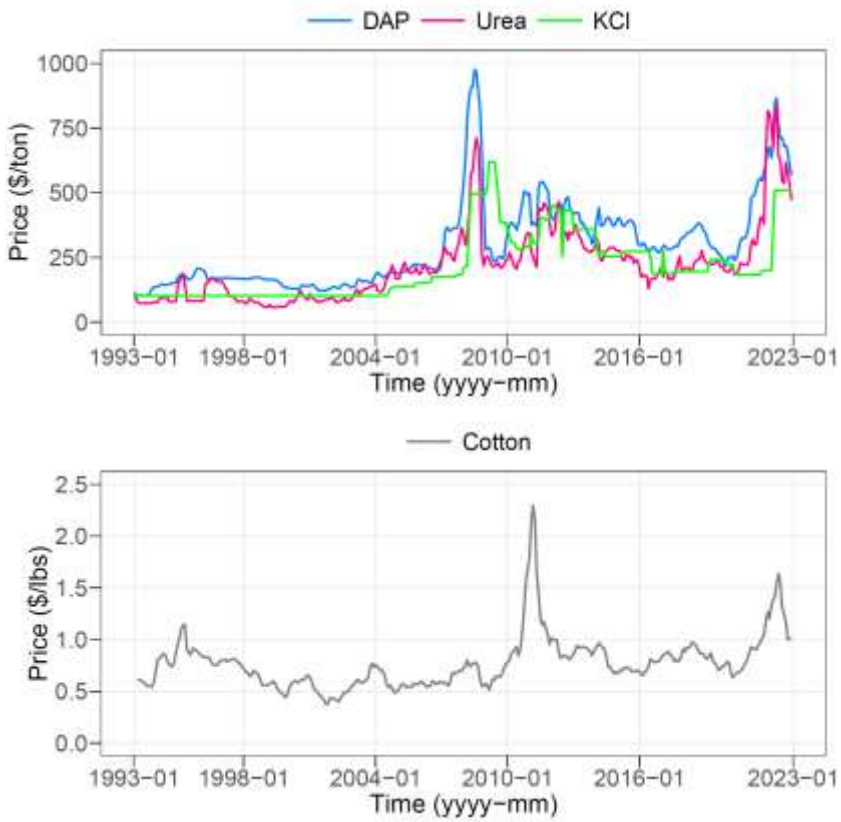


Figure 1. 2022/2023 monthly U.S. cotton production, total demand, and ending stock projections by U.S. Department of Agriculture. Total cotton demand includes domestic use and exports. The production and total demand are labeled on the left Y-axis, and the ending stock is labeled on the right Y-axis. Data retrieved from U.S. Department of Agriculture, World Agricultural Supply and Demand Estimates Reports (May 2022 – March 2023).

Efficient Nutrient Management Strategies for Cotton (*Henry Sintim and Glen Harris*): Increased fertilizer prices in recent years call for more efficient nutrient management to increase crop productivity,

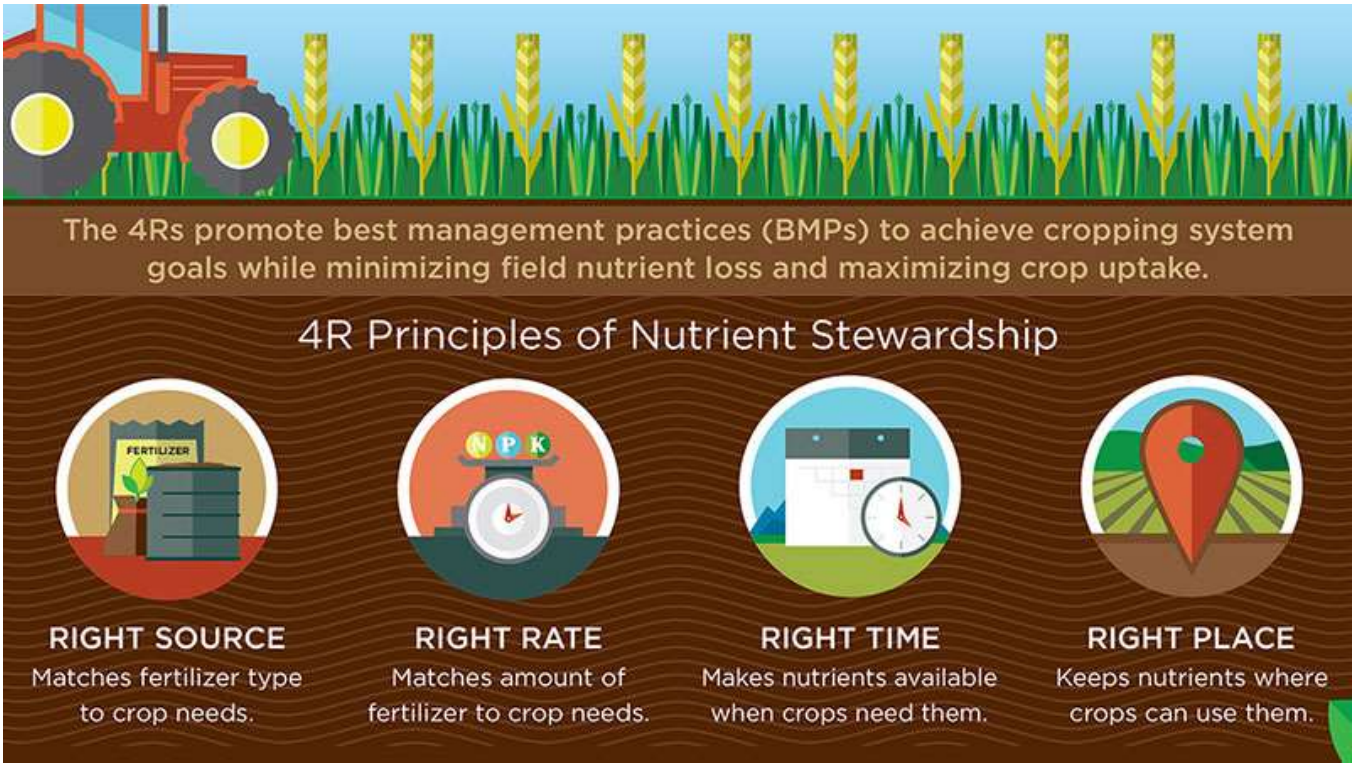
while limiting costs and adverse environmental impacts. The price of DAP, urea, and KCl have not returned to pre-COVID-19 levels in 2019. The average price of DAP, urea, and KCl in 2019 was $278/ton, $223/ton, and $232/ton, respectively, compared to $700/ton, $635/ton, and $472/ton, respectively in 2022. This reflects a 152%, 185%, and 103% price increase, respectively. The average price of cotton has also increased, being $0.78/lb in 2019 and $1.30/lb in 2022, reflecting only a 66.8% price increase. The disparity in the price increase, essentially, reduces the profit margins for growers should all other input costs increase correspondingly.



The figure shows the monthly prices of DAP, urea, KCl, and cotton from January 1993 to December 2022. The prices were obtained from IndexMundi.

Lessons from the 2008 volatility in fertilizer prices suggest that farmers may not be willing to buy the usual tonnage of fertilizers at high price levels [1]. In fact, the high fertilizer prices in 2008 may have contributed to the reduced cotton lint yield in succeeding years [2]. The average cotton lint yield in the USA in 2007 was 785 lb/ac, but it dropped to 723 lb/ac in 2008 and 696 in 2008. We, therefore, do not recommend cutting down on fertilizer simply to save on production input costs. The 4Rs of nutrient stewardship should inform your nutrient management decisions. Ensure you are matching the fertilizer type and amount with crop needs, and also making the nutrients available when the crop needs them, as well as keeping the nutrient where the crops can use them. It is important to collect soil samples and have

soil test analyses completed. This will give insight into the nutritional status of your soil and also determine the fertilizer and lime requirements.



The University of Georgia Extension fertilizer recommendations for cotton are based on yield goals and soil test reports of analyses with the Mehlich I extraction method. UGFERTEX is a Windows-based online system for formulating prescription lime and nutrient guidelines for agronomic crops in the state. UGFertex can be accessed on the UGA-AESL website (https://aesl.ces.uga.edu/calculators/ugfertex/). Note that the recommendations are based on Mehlich I extraction so do not follow the recommendations if your soil was analyzed with other methods, such as Mehlich III, which is becoming popular among neighboring states. There are different fertilizer recommendations based on the soil type, which is determined by the county. Below is a sample report generated with UGFERTEX for cotton with lint yield goal of 1500 lb/ac and for a typical Coastal Plains soil. Recent studies in Georgia show that even though modern cotton cultivars are efficient in nutrient uptake and assimilation, the fertilizer recommendations still hold, and do not call for reducing the nutrient application rates.

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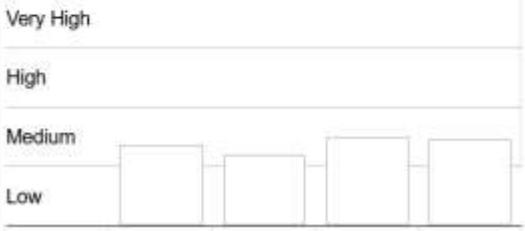
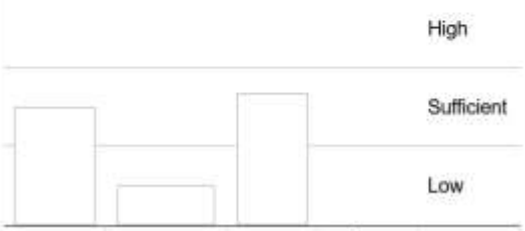
UGFertex-Based Nutrient Application Guidelines

Client:	**Blank**	Field ID:	**LF-10211**
County:	**Tift**	Date:	**3/20/2023**
Soil Group:	**Coastal Plain**	Plow Depth:	**8** inches
Crop:	**Cotton**	Previous Crop:	**Corn (New Ground) - Irrigated**
Yield Goal:	**1500 lbs**	Irrigated:	**Yes**

Results





Soil Test Index	Phosphorus	Potassium	Calcium	Magnesium	Zinc	Manganese	Soil pH	Lime Buffer Capacity	Soil Test Index
	41 lbs/Acre	**89 lbs/Acre**	**621 lbs/Acre**	**44 lbs/Acre**	**3 lbs/Acre**	**5 lbs/Acre**	**6.2**		

Buildup:	Soil P: **0**	P_2O_5 Required: **0** lbs/a/year	Years Required For Buildup **1**	Starter:	N: **0**	
	Soil K: **0**	K_2O Required: **0** lbs/a/year			P_2O_5: **0**	

Lime and Nutrient Guidelines

Limestone	Nitrogen (N)	Phosphate (P_2O_5)	Potash (K_2O)	Calcium (Ca)	Magnesium (Mg)	Sulfur (S)	Boron (B)	Manganese (Mn)	Zinc (Zn)
0 tons/Acre	**95** lbs/Acre	**80** lbs/Acre	**100** lbs/Acre	**0 lbs/Acre**	**0 lbs/Acre**	**10** lbs/Acre	**0.5** lbs/Acre	**10** lbs/Acre	**0** lbs/Acre

Comments

If rank growth has occurred in this field in the past, decrease the N rate by 25 pounds/acre. Apply 1/3 to 1/2 of the recommended N at planting and the remainder as sidedress application(s) at first square to first bloom.

If vegetative growth has been inadequate in this field in the past, increase the N rate by 20 pounds/acre. Nitrogen in excess of 100 pounds/acre may be detrimental if insect control is inadequate.

When S is recommended, apply it with the sidedress nitrogen application. The boron (B) can be applied with the fertilizer or it can be applied in two applications of 0.25 pound B/acre with the insecticide sprays.

Soil test results indicate deficiency of Manganese is possible. For confirmation, take a leaf blade sample for analysis between first square and first bloom, and correct with foliar applications if needed.

A cheaper source of nutrients that we highly recommend for growers, especially row crop growers, is poultry litter (manure mixed with bedding material). Georgia continues to be the leading producer of broiler in the United States for the past decade, with production of 1.3 billion heads in 2021 [3]. According to the Georgia 2023 Ag Snapshot, broiler production contributed $4.2 billion to the agricultural economy of the state, and approximately, three out of every four Georgia counties are involved in poultry and egg production [4]. Poultry litter contains approximately 3% N, 3% P_2O_5 and 2%

K_2O (fertilizer value of 3-3-2). Based on this average, one ton of poultry litter contains 60 lbs of N, 60 lbs of P_2O_5, and 40 lbs of K_2O. On average, 60% N, 80% P, and 80% K of the nutrients in the poultry litter should be available in the first year. Assuming the unit price of N is \$0.97/pounds, P_2O_5 is \$0.68/pounds, and that of K_2O is \$0.70/pounds, poultry litter can be valued at \$90/ton, which is considerably cheaper than what growers are getting it for. Note that the nutrient content of litter does vary significantly, depending on moisture content, type of bird, feed ration and especially storage and handling methods. Therefore, it is highly recommended that litter be analyzed for nutrients by a reputable laboratory before determining application rates and value. Also, consider applying poultry litter as preplant incorporated, and closer to the planting season, to get the most value and reduce nutrient losses.

Poultry litter being spread on a cotton field using a small mechanical spreader. Photo credit: H. Tewolde [5].

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Want to learn more about the H.SINTIM LAB visit **https://sintim.uga.edu/**

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3. USDA-NASS *Broilers: Inventory by State, US*; USDA-National Agricultural Statistics Service, Washington, DC, United States, 2021;
4. Kane, S.P. *Ag Snapshots 2023: A Brief Focus on Georgia's Agricultural Industry*; Center for Agribusiness and Economic Development, University of Georgia, Athens, GA, United States, 2023;
5. Heitman, C. Getting maximum profit, minimal pollution; News Release, Crop Science Society of America, Madison, WI, 2016;

Irrigation System Prep and Early Season Water Requirements for Cotton Production (*Wes Porter, David Hall, Jason Mallard, and Phillip Edwards*): We are moving into the time when cotton planting is beginning, countless hours and many dollars have been spent on tillage, spraying and planting equipment to be prepared for another year. However, make sure that you do not overlook one of your largest investments and one that is just as important as any other, your irrigation systems. Now is an optimal time, if you have not already done so, to do routine and preventative maintenance on your irrigation systems to ensure they are in top shape and prepared for the season. There are two important actions that need to be performed before you begin planting your cotton. The first one is an overall irrigation system check and the second is specifically focusing on water application uniformity of your system. First look up the Spring Center Pivot and Lateral Irrigation System Preparation | UGA Cooperative Extension (B1452) and go through the checklist that includes all main components on your irrigation system to ensure that they are working properly. Some of these components can include but are not limited to the power unit, pumping system, pipes and drains, electrical systems (which includes cellular connections for remote monitoring and GPS), safeties, tires, gear box oil level and leaks, and the switches on the auto stop feature. Once you have checked all of these components, start the irrigation system and finish checking components by documenting any clogged or partially clogged nozzles along with any visible leaks. Also, check the line pressure, flow, sprinklers, end gun arc travel and booster pump operation. A reduction in pressure and GPM from last year or brass and excessive sand in the trap may be a good indication of potential well issues. An example of the system flowrate and application rate for a center-pivot irrigation system is represented in Figure 1. It is important to remember that due to increasing travel speed as we move towards the end of the pivot, the system flow rate (represented as dashed black line) will go up, but the application depth (represented as solid blue line) should remain consistent. This is achieved with properly sized sprinkler packages.

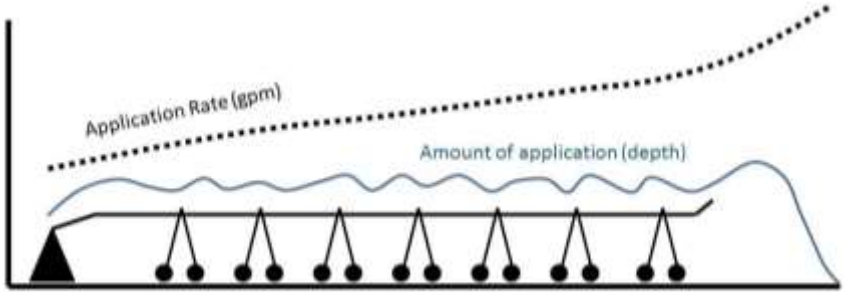

Figure 1. Application rate and depth across a pivot tower.

It is important to note that it can be very difficult to detect differences between individual sprinklers and banks of sprinklers on a pivot visually so it is strongly recommended that an application uniformity test be performed on the center pivot to detect any discrepancies along the tower length. A UGA Factsheet titled Evaluating and Interpreting Application Uniformity of Center Pivot Irrigation Systems | UGA Cooperative Extension (C911) is a very good step by step guide to accomplish this process. If you need any further guidance on either of these, or have interest in having an on-farm uniformity test performed, contact your UGA County Extension Agent and they can help get the process started. By following these suggestions, you should have a properly operating pivot ready to go for the upcoming production season.

Once you have the pivot up and running and are confident that it is adequately applying water uniformly with no problems, it is time to start thinking about water requirements for your crops. It's important that you keep an eye on the current weather and soil moisture conditions as you begin planting crops. Cotton typically does not require a lot of water (Figure 2) in the first month after planting 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. However, if it gets hot and dry you may need to apply a few small irrigation applications. The red box below represents the first five weeks of cotton water requirements 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. So, your actual water/irrigation requirement may vary slightly based on weather conditions and rainfall during the growing 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. As cotton responds negatively to over-irrigation during critical growth periods usually causing yield reductions and increases in water applied. Even if the yield is not reduced methods such as the Checkbook have shown to have much higher irrigation application amounts with lower irrigation water use efficiency (IWUE) amounts, meaning profit is lost. An example of this is seen from the 2020 growing season in Table 1 below. For more information about either of these contact your local county Extension Agent.

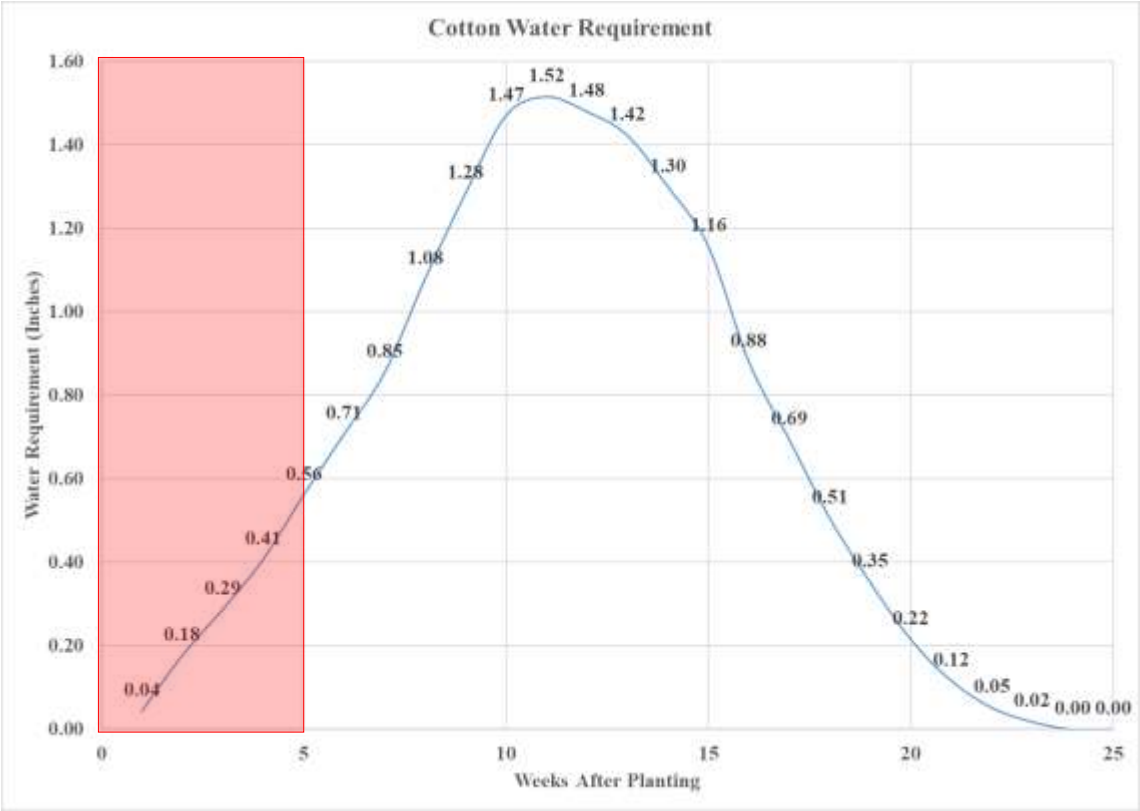

Figure 2. Seasonal Cotton Water Requirement.

As mentioned earlier, UGA Extension's cotton irrigation guide recommends very little water once the stand is established. Once the planters start rolling, farmers will be focused specifically on planting to try to finish while sufficient moisture is present to ensure a good germination and stand. Once moisture begins to leave the optimum planting level, plan your planting schedule around an irrigation event the day before planting, if available. Keep in mind, you will want to be planting the next day to optimize the moisture. In doing this, careful consideration to the amount of water applied must be determined using such factors as available moisture, soil type and projected weather. There is a fine line between not being able to reap the benefits of irrigation by not applying enough water or having to wait an extra day to dry out, costing time and money.

UGA Extension has developed a quick and easy irrigation scheduling guide that is laminated and contains the four major row crops grown in Georgia. The guide can also be downloaded at Irrigation Reference Guide for Corn, Cotton, Peanuts, and Soybeans | UGA Cooperative Extension.

Further questions about early season cotton irrigation and specific situations should be directed to your local UGA Extension County Agent.

Table 1. 2020 Cotton irrigation scheduling data, showing that more advanced methods provide higher yields and IWUE.

Treatment	Irrigation (in)	Total Water (in)	Lint Yield (lb/ac)	IWUE (lb/in)
Rainfed	1.0	22.4	795	N/A
45 kPa	5.5	26.9	1304	237
20 kPa	7.75	29.1	1293	167
75 kPa	3.25	24.6	1129	347
Irrigator Pro	5.5	26.9	1245	226
Valley Scheduler	8.5	29.9	1240	147
SI Cotton App	6.25	27.6	1270	203
Checkbook	11.0	32.4	1196	109

Thrips Management: Use an At-Plant Insecticide (*Phillip Roberts*): Thrips are consistent pests of cotton, infesting nearly all cotton acres planted in Georgia each year. Thrips are the only insect pest of cotton that a preventive insecticide is recommended. We consistently observe a positive yield response to at-plant insecticides used for thrips control. A reactive approach based on scouting and use of thresholds is recommended for less consistent insect pests such as stink bugs, corn earworms, whiteflies and others to maximize profitability. With most insect pests there are agronomic and management practices which influence the risk and severity of infestations. Below are a few thoughts to consider as you make decisions for your at-plant thrips management program.

1. Use a preventive insecticide at planting. Thrips will infest near 100 percent of cotton planted in Georgia. We consistently observe positive yield responses in UGA research and on the farm when an at-plant insecticide is used for thrips control. It is not feasible to control thrips with foliar sprays alone.

2. At-plant insecticide options include in-furrow granule applications of aldicarb, in-furrow liquid applications of imidacloprid or acephate, and commercial seed treatments of imidacloprid, thiamethoxam, and acephate. In-furrow applications of aldicarb, imidacloprid, and acephate tend to provide greater control and longer residual control compared to seed treatments.

3. Thrips infestations are generally higher on early planted cotton compared with later planted cotton. High risk planting dates for thrips injury is a moving target from year to year. The **Thrips Infestation Predictor for Cotton** (https://products.climate.ncsu.edu/ag/cottontip/) is a web-based

tool which predicts thrips risk by location and planting date. If the risk is high for thrips on a given planting date, consider using a more active at-plant insecticide or be prepared to scout and potentially make a timely foliar spray if a seed treatment is used.

4. Thrips infestations are significantly lower in reduced tillage production systems compared with conventional tillage. In general, the more cover or residue on the soil surface the greater the reduction in thrips.

5. Cotton seedlings are most sensitive to yield loss from thrips feeding during early stages of development. Excessive thrips feeding and plant injury on 1-2 leaf cotton has a greater yield penalty than cotton infested at the 3-4 leaf stage. Once cotton reaches the 4-leaf stage and is growing rapidly, thrips are rarely an economic pest.

6. Slow growing seedlings are more susceptible to thrips than rapidly growing seedlings. If cotton is slow growing due to herbicide injury, cool temperatures, or other stresses, be sure to scout for thrips and thrips injury. Thrips feed in the terminal bud on unfurled leaves so more feeding occurs on each unfurled leaf if the plant is growing slowly.

7. Scout for thrips and injury early. The threshold for thrips is 2-3 thrips per plant with immatures present. The presence of immature thrips suggests the at-plant insecticide is not providing control (i.e. thrips eggs were laid on the plant, eggs hatched, and immature thrips are surviving). Immature thrips are crème colored and lack wings whereas adults will typically be brown with wings.

Planter Preparation (*Simer Virk and Wes Porter*): While we are still few weeks out from planting cotton, this is a perfect time for growers to check their planters and perform any required maintenance to ensure they are field-ready and dialed in for peak performance. While some of the planters are currently being or may have already been used to plant corn, it's important to note that some planter settings need significant changes between the two crops to ensure accurate metering and seed placement. Negligence towards proper setup and mistakes at planting can quickly become costly. A checklist is available here (Planter Checklist) to perform a thorough planter inspection. Here are few other points to consider related to planter setup and in-field checks when getting the planter ready for planting cotton:

1. Seed depth – Recommended seed depth for planting cotton is 0.5 to 1.0 inches. If the same planter was used for planting corn, it is most likely set closer to 1.5 to 2.0 inches deep. Verify seed depth before planting both on a hard surface and in the field. Mechanical seed depth settings can vary among the row units on the same planter so take the time to check planted seed depth for each row unit and make necessary adjustments. This is very important, especially when planting cotton at shallower depths (0.5 inch) as even a small deviation in the depth settings across the planter can result in large, actual planted seed depth variations in the field.

2. Downforce – Proper planter downforce is important to achieve target seeding depth so make sure the downforce system (whether utilizing mechanical or active system) is set to apply adequate

downforce on each row unit. For planting cotton, the required downforce ranges from none (just the weight of the row unit itself) to 200 lbs depending on the soil type, moisture, and field conditions at planting. Lighter sandy soils and conventional tillage systems require considerably less downforce than heavy loamy soils and conservation systems. Field conditions can change between the fields so make sure to adjust downforce settings as needed when moving from one field to another.

3. Seeding Rate – Recommended seeding rate for cotton is at least 2 seeds per row-foot to attain a plant population of 1.5 to 1.75 plants per row-foot. If the planter was used for corn, make sure to change the seed meter setup including seed disc and adjust the seeding rate accordingly for cotton. For growers planting closer to 2 seeds per row-foot, it is critical to avoid any seed metering and placement issues as it may lower the planted population below the minimum recommended seeding rate. For growers without a seed monitor, it is highly recommended to check seed meters on a test stand before planting to verify meter performance, especially singulation. Cotton seed being smaller than corn is also more sensitive to changes in vacuum pressure, so make sure to adjust the vacuum appropriately to avoid skips and multiples.

4. Seed Placement and Seed-to-Soil Contact – Proper setup and functioning of row-cleaners (when planting in conservation systems), double-disc openers, gauge-wheels, and closing wheels for field conditions is critical to attain adequate seed placement and proper seed-to-soil contact. Make sure that the double-disc openers are creating a true V-shape furrow, gauge wheels are running tightly (but not rubbing excessively) against the opening-discs, and closing wheels are aligned perfectly behind the planter and set to apply adequate pressure on the furrow. Check for any misalignment of furrow opening or closing components and improper furrow formation when doing field checks behind the planter and make necessary adjustments.

5. Planting Technology – Issues with planting technology during the planting season are common and can cost both significant time and money. Perform a thorough and timely inspection before planting to check the status and functioning of all technology components including GPS, seed monitor, wiring harnesses, seed tube sensors, rate control module, electric seed meters, and active downforce system (if available) as well as for any subscription or latest firmware updates for the GPS and the in-cab display. Back up your planting data from the previous year if haven't done so already and make sure the seeding prescriptions are ready to go if planning to implement any variable-rate cotton seeding this year.

A Brief Look at the Coming Growing Season (*Pam Knox*): As many of you probably already know, our 3-year La Nina has come and gone and we are now in neutral conditions. The Eastern Pacific Ocean is already showing signs of swinging into the opposite phase, El Nino. During neutral conditions in the summer months, there is a limited amount we can say about the growing season, because the statistical relationships are not strong. However, by looking at the long-range forecasts and the likely impacts of the transitioning ENSO over the next few months, we can identify a few climate factors that you are likely to see.

The long-range forecast maps for the next few weeks show that overall, warmer than normal conditions are likely again this year. This is due to the long-term warming trend we are seeing due to global warming. In South Central Georgia the average growing season (April through September) temperature has risen about 2 degrees F since 1960, although there is a lot of year-to-year variability. The prediction for most of the Southeast for precipitation is for equal chances of below, near, and above normal rainfall, so there is not much guidance there. However, the dynamical models indicate that we can expect some cooler and drier conditions in the next month before we revert to more typical weather. That might slow down the initial growth of cotton somewhat although with a lack of rain the amount of sunshine we get might be higher than normal. While some cooler weather is likely, I don't see any evidence of a late frost anywhere in Georgia except perhaps for the far northeast mountains. There is no sign of an impending drought, either, although the counties that border Florida could see some dry conditions for the next few weeks.

With a neutral ENSO pattern, the Atlantic tropical season is likely to start early and could be active if the transition to El Nino is delayed. However, if El Nino comes early, as some signs indicate, we expect to see fewer storms late in the growing season, which would be great news for our growers. Of course, it only takes one blowing right over your fields for a lot of damage to occur, so growers will need to continue to watch the tropical weather over the growing season and be prepared to take action if necessary.

A Pre-season Checklist for Diseases and Nematodes of Cotton (*Bob Kemerait*): I do not like to re-cycle a newsletter article, yet I don't think I can improve much over this one from last year. What was true in 2022 is even more so in 2023 following a "3-peat" La Niña winter. So here goes…

The 2023 cotton season is upon us and some of the most important decisions growers can make to protect their crop from nematodes and diseases can only be made BEFORE the furrow is closed. Once the furrow is closed, the grower watches from the sidelines as the cotton crop battles nematodes, seedling disease, Fusarium wilt, and bacterial blight. The most important tactics to protect a cotton crop from these maladies are over when the furrow is closed.

Seedling diseases are a significant threat to cotton production in Georgia and will result in significant stand loss if not effectively managed. The vast majority of seedling diseases are caused by fungal pathogens, especially *Pythium* (pre-emergent damping off) and *Rhizoctonia solani* (post-emergent "soreshin"). Key tactics to minimizing risk to seedling diseases include:

1. Avoid planting into soils that are not 65°F or warmer.

2. Do not plant if wetter and cooler temperatures that could significantly drop soil temperatures are in the forecast in the upcoming 7 days.

3. Ensure that seed is adequately protected with a seed treatment that included a combination of fungicides to protect against Rhizoctonia, Pythium, and other fungal pathogens.

4. When growers will plant into a field where risk to seedling disease is increased, e.g. short cotton rotations or conservation tillage, consideration should be given to use of additional seed treatments or in-furrow fungicides.

Nematodes will always be a threat to cotton production in Georgia. Decisions made at planting could easily be the difference between a profit and a loss in a specific field or in multiple fields. Key tactics to protecting a crop against nematodes include:

1. Consider rotation with peanuts to reduce risk to nearly all nematodes that affect cotton. Planting corn in rotation with cotton can reduce risk to reniform nematodes.

2. Pull soil samples at harvest in the previous season to have a "heads up" for the types of nematodes and the population size of parasitic nematodes waiting for the next cotton crop. Knowing "what" and "how many" will allow growers to make the most informed decisions.

3. Where a field is infested with southern root-knot or reniform nematodes, growers should recognize that they have the opportunity to plant resistant varieties. A nematicide is not needed where root-knot nematode varieties are planted in a root-knot infested field. It is unlikely that nematicides will be needed when a reniform nematode resistant variety is planted into a reniform-infested field except where reniform populations have been very high. If sting or Columbia lance nematodes are present, resistant varieties are not available and the only management tool is to use a nematicide.

4. Where a resistant variety is not planted into a field infested with plant-parasitic nematodes (southern root-knot, reniform, sting, or Columbia lance), growers are advised to consider using a nematicide to protect the crop. Fumigation with Telone II (3 gal/A) is the most aggressive treatment. Next would be AgLogic 15G (5-7 lb/A) and Velum (6.5-6.8 fl oz/A) followed by nematicide seed treatments to include Copeo, Avicta, and BIOst.

Fusarium wilt is a serious problem in specific fields. Fusarium wilt results from the interaction between the Fusarium fungus and nematodes which damage the cotton crop. The damage from the nematodes allows the fungus to infect the roots of the cotton plant. To best manage Fusarium wilt disease, growers must effectively manage nematodes in the field, often with a nematicide.

Bacterial blight has not been a significant problem in Georgia over the past few years; however, this disease can cause yield loss in specific fields. The only effective management strategy for bacterial blight is to plant a disease-resistant variety.

Approximately five months after cotton is planted, the cotton is harvested. Five months is a long time. But five months can seem even longer if the crop is not adequately protected from diseases and nematodes on the day that the furrow is closed. Make your decisions carefully.

Thoughts Ahead of Planting (*Camp Hand*): As we approach another growing season, I can't help but be excited. This is one of my favorite times of year. As we look ahead to planting, I have a couple of thoughts:

First, the entirety of this newsletter contains incredibly valuable information on a wide array of topics as we approach planting, but two topics in particular that are addressed here are planter setup and irrigation prior to and at planting. These are two things I always gravitate towards at planting time, because we always need to plant into good moisture to assist in getting a stand (even if that means irrigating a field prior to planting), and we need to make sure our planters are "dialed-in" so we can be sure of the amount of seed we are planting and at what depth we are planting it. Drs. Wes Porter and Simer Virk do a great job discussing these two topics within this newsletter.

Planting Dates – In Georgia, we are extremely blessed with a wide planting window that many growers across the cotton belt don't have. In some parts of the cotton belt, growers must get the entirety of their crop planted in 10 days. For plot work, I intend to get my first cotton in the ground this week, and I'll finish sometime around the first week in June. Last year we planted from April 18 to June 16. So realistically, we have a month and a half or two months where cotton could be planted and a crop harvested in Georgia. But planting date will ultimately impact other aspects of management throughout the season. In this newsletter, Dr. Phillip Roberts talks about thrips and silverleaf whiteflies, and management of both pests can be impacted by planting date. Our earlier planted cotton is more susceptible to heavy thrips pressure than our later planted cotton, while our later planted cotton is more susceptible to silverleaf whitefly. Growth management will be impacted by planting date, as I would generally use a more aggressive PGR management strategy for late planted cotton than I would for earlier planted cotton. One thing that the entire UGA Cotton Team dedicated a lot of time to last year was boll rot, and I believe that is also impacted by planting date. Our earlier planted cotton (April to early May) is likely going to be more susceptible to boll rot because of late August/early September rainy, overcast, humid conditions during boll opening. However, our later planted cotton generally has less boll rot. Now why am I talking about all this? It's only April! **There are pros and cons to every planting date!!!** Many people I talked to this off season said, "Yeah, but I cover a lot of ground and have to get started sometime!" I agree 100%! Planting dates should be spread throughout the planting window, and your biggest issues with respect to production should be considered (i.e. if you are in a heavy silverleaf whitefly area, I would be on the front end of the planting window).

Seeding Rates – I have talked to a lot of people about seeding rates in the last few months. So much so that I intend to dedicate a large portion of time to seeding rate research this season. Most people would agree that on average, growers in Georgia plant approximately 2 seed/foot, which equates to approximately 30k seed/acre. There are many growers that are planting less than that, and some that may be planting more. But I get the question quite often about reducing seeding rates. There has been a lot of

research done in the last few years on seeding rates across Georgia by some of our county agents – Cole Moon of Bleckley County has dedicated a lot of time to this. His work has shown little to no yield losses when planting 20k seed/acre compared to seeding rates as high as 40k seed/acre. Now, if you're a grower reading this, you are probably thinking, "I would never go as low as 20k seed/acre." I've had many say that to me after I share those results with them, and there is nothing wrong with that! At the end of the day, use the seeding rate you are comfortable with and are confident you will get a stand with in your fields, with the variety you have decided to plant.

Be confident in your inputs – The last think I want to talk about is being confident in the inputs you decide to utilize for the 2023 cotton crop. Cotton prices are down, and inputs are still high. If you have read the entirety of this newsletter, there are a lot of inputs that everyone has discussed that shouldn't be cut – fertilizers, at-plant insecticides, preemergence herbicides, nematicides (in nematode fields), etc. The things that the UGA Cotton Team recommends are recommended for a reason – because we are confident that growers will get a return on that investment. There are a lot of products that growers are sold each year that are new, or have little to no data available on them, that myself and others on the cotton team have never heard of. I started testing some of these products last year, some of which are microbials, biopesticides, biostimulants, or mild "fertility" products that all are supposed to improve stand establishment, vigor, and maybe even yield. Last year, I did not see any advantage to using any of the eight products I tested (across four locations), at any application timing (in-furrow or foliar), compared to doing nothing. I will be expanding my research on some of these products in 2023, along with many of my counterparts across the cotton belt. But at the end of the day, all of this is to say that if you decide to cut inputs, don't cut the ones that you are confident will provide a return on that investment. If you cut somewhere, cut the stuff that isn't proven to provide a return on investment.

As always, if you have any questions about these topics or anything else, please don't hesitate to reach out! Your local UGA County Extension Agent, myself, and the rest of the cotton team are here to help!

Keeping Early Season Planting Considerations Simple (*John Snider, Camp Hand, Josh Lee*):
Conversations with my fellow cotton team members have been extremely beneficial for my professional development. Over the winter, I've learned that some of my colleagues will take a 30-minute presentation [with all the tables, figures, bullet points, and detailed explanations that I think are so vital] and boil it down to a one or two-line statement. For example, my presentation might be simplified to "More water doesn't always mean more cotton." Camp's presentation might be simplified to "Plant a variety from the on-farm variety trials; the best choice depends on your production environment." Phillip Roberts' presentation could be simplified to "Scout, and spray when thresholds are met." Obviously, we all know there is a lot more to each of these statements than meets the eye, but they provide a platform from which to ask additional questions. For the first example, one may ask "How much water does a cotton plant need and when does it need it? For the second example, natural follow up questions could be "What varieties are most appropriate for my particular production scenario and why?" For the third example, I personally would ask the question "How do I scout for specific pests and what are the thresholds for each?" So, in the spirit of simplifying things, I've come up with a few overly simplistic recommendations and specific follow up considerations for the germination and emergence stage of crop development.

Cotton doesn't like it when it's cold, so plant when it's warm.

- **How cold is too cold for cotton?** Chilling temperatures are less than 50 °F but above freezing. These temperatures can kill or severely injur a developing seedling if experienced during early germination and will slow plant growth more than predicted by DD60 accumulation when experienced after emergence. Check the forecast for your region prior to planting.
- **What are ideal temperature conditions for planting?** The current recommendation is for planting to occur when soil temperatures are 65 °F or above for three consecutive days and when 50 DD60s are projected to accumulate within five days after planting. These conditions are conducive to rapid germination and vigorous seedling growth, which has the added benefit of decreasing the damage that can be done by early season pests.
- **What's a DD60?** This is the number of degree days accumulated over a particular period of time. The most simplistic formula for calculating daily DD60s is as follows:

$$DD60 = [(Tmax + Tmin)/2] - 60\ °F$$

Other approaches to DD60 calculation also set an upper temperature threshold or a daily limit of 10 DD60s. DD60 calculators are available at http://www.georgiaweather.net/.

Too much or too little water limits stand establishment.

- **Too much water?** I'm talking about waterlogging here. Oxygen is a requirement for growth during the germination phase, so waterlogging suffocates plants by creating anaerobic conditions. Having a well-aerated seed bed and avoiding excessively wet soil conditions via proper planting date selection and knowledge of field history can help lessen these problems.
- **Too little water?** The cotton seed contains a desiccated embryo that is ~8-10% moisture, which is substantially drier than other tissues on a fully-grown cotton plant (80-90% relative water content for leaves). As a result, the cotton seed readily takes up water from the surrounding soil even if the water content of the soil is low. This can be problematic if the soil profile has a relatively low soil water content at planting because the seed is more susceptible to dehydration stress after embryonic tissues have been hydrated. Obvious remedies for this situation include post-planting irrigation for fields in which irrigation is available or planting into good soil moisture for dryland fields and knocking beds down at planting to minimize water loss from the upper portion of the soil profile before harvest. Planting depth affects moisture availability too. The current recommendation in Georgia is to plant seed at a 0.5 to 1 inch depth. Deeper planted seeds have access to more soil moisture, but risk of stand loss increases with depth, so planting a variety with high seedling vigor may be necessary in these instances.

If you've got crusting, get a rotary hoe soon.

- **What is crusting?** I'm sure just about everyone reading this knows what crusting is, but rather than assume too much, I'll explain here. Crusting is when a thin compacted soil layer forms over a field. The reason this is a problem is because the cotton seedling often cannot exert enough pressure to break through the crust. If this crust isn't broken up in time, the grower may be looking at a replant situation.
- **When should a rotary hoe be used?** A rotary hoe would only be used where crusting was a widespread issue in the field, but timing matters. As a general rule, a rotary hoe should be run within 10 days after planting to ensure that plants don't just sit under the soil surface and rot. However, I have also had good luck using a rotary hoe as late as 15 days after planting, provided the seedlings I dug up exhibited normal development (a well-developed seedling radicle, pronounced hypocotyl hook, and no visual evidence of disease). The best thing to do is dig up some plants and see what you're dealing with before making the decision to use a rotary hoe.

Make sure your planting equipment is fully functional and ready for planting.

- **What should be done?** Ensure that all parts of the planter are in good working order. It's best not to waste time and investment in cotton seed just to find out there was a planter problem after a field has been planted. Dr. Virk has provided guidelines to ensure that your planters are ready for the season. Read his article and prepare equipment accordingly. Incorrect planter setup can lead to 1) poor seed to soil contact, which could limit imbibition and germination and 2) inaccurate depth settings which could result in embryo dehydration if planted too shallow or inability of the seedling to reach the surface if planted too deep.

The Georgia Cotton Farmer, Dicamba, and the Future of Pesticides (*Stanley Culpepper*): Over 90% of Georgia's cotton farmers value the ability of using dicamba postemergence in their cotton crop with the belief that weed control, primarily for pigweed, is improved. The future of this technology is, of course, unknown as both the courts and our regulatory partners will influence its fate moving forward. In fact, the potential for the courts and those regulatory agencies to influence the practical use of all of the nearly 1200 registered pesticide active ingredients has gained national attention over the last year mostly in response to the challenges posed by the Endangered Species Act.

Although our science documents that the availability of economically effective pesticides are essential for farm sustainability and for the ability of our farms to provide safe, affordable, and accessible food, feed, and fiber for the world, that simply does not guarantee their preservation. In fact, the responsibility of all farmers and their applicators is to steward each and every pesticide, making certain these products are applied on-target and stay there. Working together for improved pesticide stewardship provides the opportunity to preserve the practical use of our herbicides, fungicides, insecticides, and fumigants as well as to improve the safety for the applicator, their family, neighbors, consumers, and our environment.

Since 2014, the University of Georgia Cooperative Extension Service has documented more than an 80% reduction in pesticide drift complaints across the state, even during the adoption of auxin tolerant cotton and soybean technologies. Although this is an accomplishment to celebrate, there continues to be a few poor decisions, especially with auxin herbicides, that must be eliminated.

To further improve Georgia agriculture's commitment to pesticide stewardship and to help farmers learn more about the regulatory complexities facing them through the Endangered Species Act, applicators of in-crop dicamba formulations (Engenia, XtendiMax, Tavium) are required to attend the 2023 in-person Using Pesticide Wisely Training held by the University of Georgia and Georgia Department of Agriculture during March and April across the state.

The focus of this training is to ensure growers and pesticide applicators understand how vulnerable agriculture is in losing the ability of using these tools in a practical manner and what they can do to help resolve this mighty challenge.

Decisions made with 2023 dicamba applications will likely influence the future of this technology, assuming the courts do not remove the herbicides prior to the season. Make wise application decisions, and refer to the label for recommendations and restrictions. A few reminders when applying Engenia, XtendiMax, or Tavium during 2023:

1. Get the spray droplet size correct (proper spray tip, spray pressure); make sure tips are not worn out.
2. Boom height should be no more than 24 inches above the target.
3. Slow down the sprayer speed in sensitive areas.
4. Apply these products only between winds of 3-10 mph.
5. Avoid applications during inversions, do not apply until 1 hr after sunrise and stop 2 hr before sunset.
6. Include a drift reduction adjuvant when advised by the product label.
7. Be aware of in-field buffers and application cut-off dates (July 30 cotton; June 30 soybean).
8. Only include approved tank mix partners; DO NOT mix AMS with any dicamba formulation.
9. **The only formulations approved for use in-crop are:** ENGENIA, XTENDIMAX, OR TAVIUM.
10. **Always include a VRA** (Volatility Reduction Adjuvant).
11. **Do not apply if sensitive areas, crops, or residential areas are adjacent downwind.**

"It was only cold when it was cold": Winter Weather Impact on Silverleaf Whitefly RISK (*Phillip Roberts*): Silverleaf whitefly (SLWF) is a sporadic and often localized insect pest of cotton in Georgia. Infestations are most common in areas where both cotton and vegetable production occur. There are several risk factors that will ultimately influence SLWF infestations in cotton. One factor is winter weather and we have received several questions regarding the impact of this winter on potential SLWF infestations in cotton. At grower meetings this past year I was ridiculed by coworkers at times when I described the winter as *"it was only cold when it was cold"*. So, what did I mean with that statement?

SLWF survive the winter months on both cultivated and wild host plants. Although temperatures are rarely low enough in South Georgia to kill SLWF (especially nymphs and eggs), freezing temperatures

which kill host plants infested with immature SLWF effectively kills the immature stages on those plants. The University of Georgia Weather Network station on the Coastal Plain Experiment Station in Tifton (http://weather.uga.edu/) has recorded 15 days which were below 32°F from November 1 to March 31 which is near the 2004-2022 average of 16 days. These freeze events ranged from the first freeze on November 18 to the last freeze on March 20. Undoubtedly, we experienced some very cold temperatures in late December, dropping below 22°F for four consecutive nights with a low of 15.5°F on December 24th. We are hopeful these temperatures resulted in some mortality of adult SLWF, but it is unlikely these temperatures caused direct mortality of nymphs and eggs; but again, these temperatures did kill many host plants infested with immature stages on multiple dates. So, yes it was cold.

However, other than during the cold spells we generally experienced temperatures above normal. So, what does this mean in terms of SLWF? We are all familiar with cotton growing degree days or DD60s which predicts cotton growth and development. We can also calculate SLWF growing degree days where 11.1°C or 52°F is set at the lower developmental temperature. Basically, when temps are above 11.1 °C or 52°F SLWF populations are growing. SLWF complete a generation in 312 DD11.1°C (SLWF DDs). Since November 1 we have accumulated 664 SLWF DDs which is above the 20-year average of 481 and is the second highest in the past 20 years (2017 had 676 SLWF DDs). We know that SLWF populations grow exponentially with each generation and we observe this every year we see infestations in cotton. To date, SLWF are over a half a generation ahead of the 20-year average. It is probably not a coincidence that the 5 years with the greatest cumulative SLWF DDs from November 1 to March 31 are the same five years where we treated the most acres for SLWF. So, based on SLWF DDs, we would consider the RISK for SLWF in cotton to be higher than normal.

We have been monitoring SLWF populations weekly with yellow sticky traps at 20 locations in areas prone to observe SLWF since January 1, 2021. Since January 1, 2023 mean trap captures have been higher in 2023 compared with 2022 which was higher than captures in 2021. We have captured SLWF at 19 of the 20 sampling sites so we know SLWF are present in most areas sampled. Reports from county agents and consultants are that SLWF populations remain low in vegetable crops at this time. Based on sticky card captures we would consider RISK of SLWF to be higher in 2023 compared with 2022 and 2021.

It is only early April and many factors will influence SLWF infestations in cotton during 2023. Weather conditions during spring and summer will be the primary factor affecting SLWF populations from this point forward. Hot and dry conditions will favor SLWF population buildup. Rainy conditions as we observed in 2021 will deter populations. Based on information available now, it is important that growers consider practices they control which will reduce the risk of SLWF infestation in cotton. Some examples include variety selection, planting date, and order of which farms are planted. **NOW** is the time to manage risk factors we can control (Figure 1).

Manage RISK: Silverleaf Whitefly

Cotton	Low ← SLWF RISK → High			
Winter Weather	Very Cold			Mild
Variety Selection	Smooth	Semi-Smooth	Light Hairy	Hairy
Planting Date	April	early May	late May	June
Location: (proximity to SLWF infested crops)	Isolated			Near
Beneficial Insects	High	Moderate		None
Weather (in-season)	Rainy			Hot and Dry
IPM	Scouting Threshold			Not Timely
Irrigation	Irrigated			Drought Stress

Figure 1. Silverleaf whitefly risk factors in cotton.

As we prepare to plant, attempts should be made to minimize overall risk of SLWF. Decisions now could greatly influence SLWF infestations later in the summer.

1. Location (proximity to SLWF infested crops): Crops produced in a given area can be viewed as sources and sinks for SLWF populations. Spring vegetable and melon crops are a source of SLWF infesting cotton. In the fall cotton is a source of SLWF infesting fall vegetables. The nearness of cotton to a SLWF infested field increases the risk of SLWF. Minimize planting cotton next to SLWF infested crops. When planting cotton near SLWF infested crops, be sure to avoid late planting and use a smooth leaf variety. Plant farms which are at greatest risk for SLWF early to avoid late season infestations and minimize the time cotton must be protected. Destroy SLWF host crops immediately after harvest; this includes vegetable and melon crops in the spring and cotton (timely defoliation and harvest) and other crops in the fall.

2. Planting Date: the risk of SLWF problems increases as planting dates are delayed. SLWF complete a generation in about 2 weeks during summer months and populations can increase

rapidly. The impact of SLWF on yield is dependent on the growth stage of cotton when SLWF infest the crop. Potential yield loss is greater when infestations appear during squaring or early bloom compared with late bloom. The duration or time of control required to protect yield and quality from SLWF is also dependent upon planting date. April and early May planted cotton is at lower risk for SLWF problems compared with late May and June planted cotton. Bottom line is to avoid late planting.

3. Variety Selection: SLWF prefer hairy cotton compared with smooth cottons. There is a direct correlation of SLWF infestations in cotton based on the degree of leaf hairiness. Avoid hairy cottons especially if planting near a source of SLWF or if planting late.

More detailed information on SLWF biology and ecology in Georgia and area-wide management can be found in the publication "*Cross-Commodity Management of Silverleaf Whitefly in Georgia*" (https://secure.caes.uga.edu/extension/publications/files/pdf/C%201141_1.PDF) and in the UGA Cotton Production Guide found at: http://www.ugacotton.com/.

Important Dates:

Georgia Cotton Commission Mid-Year Meeting - Statesboro, GA – July 26, 2023
Southeast Research and Education Center Field Day – Midville, GA – August 9, 2023
Cotton and Peanut Research Field Day – Tifton, GA – September 6, 2023
Georgia Cotton Commission Annual Meeting and UGA Cotton Production Workshop - Tifton, GA – January 31, 2024