UNIVERSITY OF GEORGIA EXTENSION

UGA Cotton Team Newsletter
July 2022

Articles in this month's issue include:

What is Behind the Recent Cotton Futures Market Plunge? (*Yangxuan Liu*): The cotton futures market is on the decline, having experienced a dramatic selloff starting June 17, 2022. As shown in Figure 1, December 2022 Cotton Future prices dropped from the May 17, 2022 high of 134 cents per pound to around 120 cents per pound on June 15, 2022, only to be followed by a plunge to a low of 91.2 cents per pound on June 28, 2022. The selloff has created concerns among cotton producers about this year's profitability. What was the cause of the recent market plunge?

Cotton and cotton-related products are discretionary items. Thus, cotton prices tend to follow the economy, with rising cotton prices during economic growth and declining cotton prices during recessions. Many economic indicators point to the direction of a global economic slowdown, with the possibility of a recession in the United States. The S&P 500 index, one of the main indexes for the U.S. stock market, recorded a 20% drop in June from its January closing peak to confirm a bear market. Meanwhile, soaring inflation put extra pressure on consumers. The annual inflation rate in the U.S. accelerated to 8.6% in May of 2022, the highest since December 1981. Embedded in inflation, energy prices rose 34.6% and food costs surged 10.1%. Severe supply disruptions caused by geopolitical tension and Covid-19 reduced global economic productivity, hindered the ability to meet consumer demand, which resulted in an economic slowdown and high inflation rates globally.

The soaring inflation, especially for food and energy, reduced consumer confidence and forced the consumer to rebalance their budgets for spending. The University of Michigan Consumer Sentiment Index, tracking consumer attitudes and expectations about the future economic situation, was downwardly revised to a record low of 50.0 in June of 2022. The U.S. retail sales unexpectedly declined by 0.3% in May. Under high inflation, with the prices of everything rising, the decline in retail sales implies that consumer reduced their spending on discretionary items. This could lead to consumers reducing the purchase of apparel and

apparel-related products. Meanwhile, in resposne to high inflation, the Federal Reserve increased the federal funds rate to tamp down inflation – on June 15th the Federal Reserve increased interest rates by three-quarters of a percentage point, its largest rate increase since 1994 and the third rate increase in 2022. The Federal Reserve's commitment to bringing inflation back down to its target of 2% indicates a strong possibility of further interest rate hikes in 2022 and 2023. The rising interest rate further accelerated the appreciation of the U.S. dollar, as the U.S. Dollar Index reached its three-year high at 104.01. Cotton is a global commodity; on average, over 80% of cotton produced in the U.S. is exported. The appreciation of the U.S. dollar increases prices paid by foreign consumers and makes U.S. cotton less attractive.

All of these concerns contributed to the recenct decline in cotton prices from the peak. Additionally, since September of last year, the cotton futures market experienced an inflow of speculative money, which pushed cotton prices to levels that exceed those indicated by supply and demand fundamentals (more information here). The flow of speculative money in and out of cotton markets makes prices unpredictable and volatile. However, with the recent speculative money leaving the cotton market, prices fell sharply, possibly with a temporary correction below the price supported by global cotton supply and demand fundamentals.

The impact of this year's global cotton production on prices is yet to be seen. High cotton prices during the planting season attracted more cotton planted acres globally. However, the Southwest United States, the major cotton-producing region in the U.S., is experiencing severe drought and is anticipating lower production this year. Globally, the USDA June forecast for cotton production could reach 121.3 million bales, 4 million bales larger than last year. The projected USDA global ending stocks are maintained at a relatively low level at 82.7 million bales. Lower cotton production in the U.S. could provide some support for harvesting prices domestically. However, with higher global cotton production forecast, global cotton prices could drop further if the U.S. economy enters a recession and stock markets continue to experience losses for the remainder of this year.

Figure 1. December 2022 Cotton Future Prices for the Past Year (Source of the Graph: barchart.com)

Calibration Considerations for Liquid Fertilizer Applications (*Simer Virk*): With high nitrogen prices this year, it is encouraging to see lot of growers putting effort and time into calibrating their application equipment to ensure that they are not making any under- or over-rate nitrogen applications. One of the common questions in the last few weeks have been about the procedure to accurately calibrate liquid application equipment – boom sprayers or side-dress applicators – to verify the correct nitrogen application rate. The process to calibrate any liquid applicator is similar to a normal sprayer calibration, which is available with step-by-step instructions at the UGA Extension publications website and can be accessed here Sprayer Calibration Method. The Extension agents and growers with access to a SpotOn® digital meter can also use it to calibrate applicators for liquid fertilizer applications by following the procedure outlined here Using SpotOn for Boom Sprayer Calibration.

Despite the choice of calibration method, one of the major considerations when calibrating application equipment for liquid fertilizer is the difference in the density of the water and the fertilizer product. For common water-based spray applications, the pesticide rate itself does not significantly affect the actual carrier application rate (gallons per acre; GPA). Liquid fertilizers are typically heavier than water so the actual application rate (GPA) in case of liquid fertilizer applications can vary greatly, especially at higher flow rates. Hence, when calibrating liquid applicators with water for fertilizer applications, it is important to account for the density difference between the water and the fertilizer product. Table 1 below provides adjustment factors for some common liquid fertilizers including common nitrogen sources.

How to use this table: A side-dress applicator needs to be calibrated to apply 32% UAN fertilizer at an application rate of 40 GPA. At what application rate should you calibrate the sprayer when calibrating using water?

Using Table 1 below, 32% UAN has a density of 11.06 pounds per gallon and an adjustment factor of 1.15. Multiply the label rate by the adjustment factor to determine the water-only rate to be used for calibration.

32% UAN Calibration Rate (GPA) = 40 GPA X 1.15 = 46 GPA
This means that the sprayer must be calibrated to apply 46 GPA of water, so when its loaded with 32% UAN, the correct rate of 40 GPA will be applied.

Table 1. Specific gravity and adjustment factors for some common liquid fertilizer solutions.

Product	Density (lb/gal)	Specific Gravity	Adjustment Factor
28-0-0	10.65	1.28	1.13
30-0-0	10.80	1.30	1.14
32-0-0	11.06	1.33	1.15
7-21-7	11.20	1.34	1.16
10-34-0	11.40	1.37	1.17
12-0-0-26	11.50	1.38	1.17
11-37-0	11.60	1.39	1.18

For a fertilizer solution not listed in the table or more details on calculating an adjustment factor for a solution, the following publication from Dr. John Long at OSU covers it in much more detail: Using Water to Calibrate Sprayers for Fertilizers and Other Liquid Solutions.

Abiotic Stress in Cotton (*John Snider, Ved Parkash, Gurpreet Virk, Camp Hand*): As I was writing this on July 5th, I wondered how much sense it made to move forward with a writeup on abiotic stress when conditions over the past week have been pretty good for cotton production. Abiotic stress is any non-living factor [**not** insects, weeds, fungal pathogens, or nematodes] that negatively influences crop growth, development, or eventually yield. For the purposes of this newsletter, I'm focusing on temperature and water. I do a fair amount of my research in Tifton and Camilla, GA and as I look at the past week, daily high temperatures for both these locations have been in the upper 80s to mid 90s and daily minimums have been in the upper 60s to low 70s. As a general rule, cotton performs optimally when daytime temperatures are around 86 °F, and nighttime minimum temperatures are around 68 °F (plus or minus a few degrees for either one of those temperatures). Furthermore, we received a few much-needed rainfall events this past week, resulting in more than 2 inches of precipitation in Camilla, and as much as 4 inches in Tifton (depending on which weather station you look at). All of this is just to say that weather conditions over the past week have been pretty good for cotton. However, anyone who has been in a cotton field for more than this past week will know that temperature conditions and rainfall patterns leading up to this point have not been as ideal.

Temperature: Figure 1 shows the maximum and minimum daily temperatures from June 8 to June 28, 2022. These dates are significant for me because June 8 is when my cotton plants in Camilla just started to square, and June 28 [apart from being the day I turned 40] is when my cotton plants were at first flower (give or a take a few days). During this time frame, temperatures often exceeded the mid 90s during the day, which is widely regarded as a high temperature threshold above which multiple plant processes begin to be negatively impacted. The good thing about cotton is that it has an exceptional ability to keep the canopy's temperature below air temperature, provided it has enough water available to drive transpiration (more on that later). However, relative humidity also plays an important role in governing canopy temperature. If air temperature is high and relative humidity is high too, the canopy has a limited ability to cool through transpiration (less water evaporates if the air is too humid). This same concept can be applied to people. If air temperature is high and air humidity is low, our bodies are able to cool by sweating and allowing sweat to evaporate to the surrounding air (as long as we drink enough water). When this happens, water vapor takes a substantial amount of energy (heat) with it, and cools us off. Due to the high humidity and air temperature combination we've seen over the past few weeks, multiple heat advisories were issued, and you can bet that your cotton crop was feeling the heat as well. Heat stress during squaring is particularly concerning because pollen and ovule development occurs during this time frame, and both of these tissues must develop normally to ensure successful seed production. When can you expect to see the effects of heat stress? Interestingly, it won't be at the time of heat stress exposure. *If* we are going to see heat stress effects on reproduction, it will be for the flowers that are just now opening because these experienced heat stress during squaring. If we get poor pollination or fertilization on the day of flowering, a common plant response is to shed fruit. Cotton is most likely to shed fruit within the first week after flowering, so we may start seeing small boll shed for flowers that are opening now or you may have already seen some. The good thing

about cotton is that it has indeterminate growth, so even if it loses some fruit, it can continue to produce new fruiting sites and set those bolls *if* growing conditions are conducive to growth and reproduction. While growers cannot control the weather, they can do their best to ensure that their crop is not under growth limiting nutrient or water deficiency (if acres are irrigated), and this increases chances of plant recovery from heat stress.

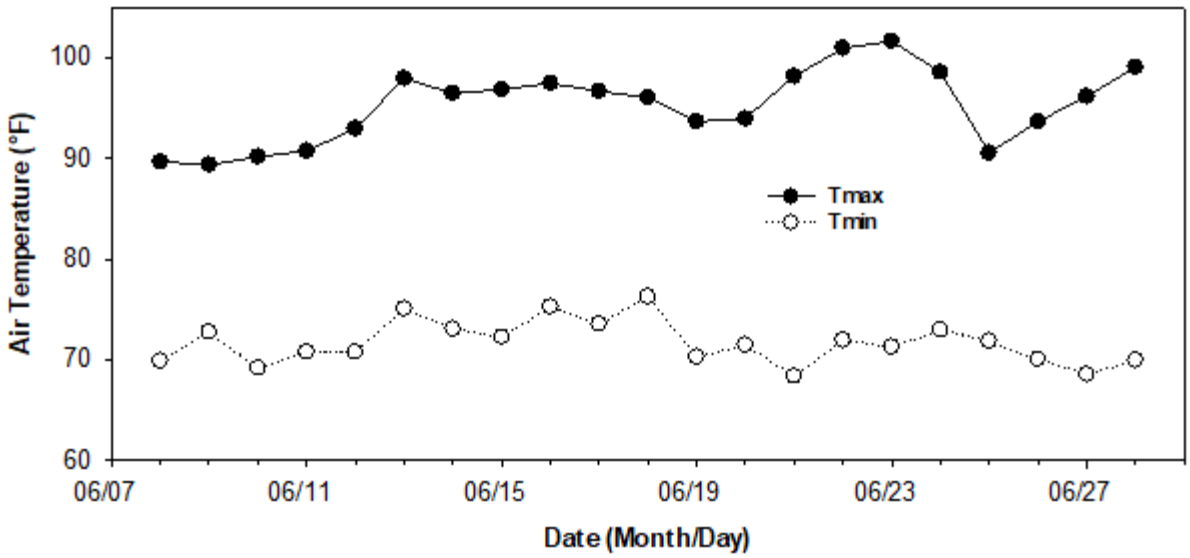


Figure 1. Daily maximum and minimum air temperatures from June 8 to June 28, the squaring period, for cotton that was planted near the end of April in Camilla, GA.

Drought stress: In Georgia, a substantial number of our acres are grown under rainfed conditions, and in some years, growers can obtain comparable yields to irrigated acres. However, one of the risks associated with dryland production is exposure to yield-limiting drought stress during critical developmental phases. Drought stress experienced early in development (before canopy closure) causes the following effects: 1) reduction in light capture by the canopy, 2) induces stomatal closure [causing lower photosynthetic rates and higher leaf temperatures], and 3) reduces either production of fruiting sites or fruit retention on existing fruiting sites. The net result is often a reduction in total bolls per plant and eventually, lower yields. Although I know that rainfall distribution can be variable throughout the state, I'd like to continue this article by following my cotton that was planted at the C.M. Stripling Irrigation Research Park in Camilla, GA in late April. Figure 2 shows rainfall distribution for the same three-week period noted in Figure 1 (Squaring to first flower). During this entire period, only a 1.25 inch rainfall event occurred after the first week of squaring, followed by two weeks of no rainfall. When low rainfall is observed in combination with high temperatures, drought stress can set in rapidly, especially in the sandy soils of the Coastal Plain. By the time this crop reached flowering, severe drought stress was apparent in dryland plots with severe wilting and reduced canopy development when compared with well-watered plots (Figure 3). Based on past experience at this site, I would not be surprised to see yield reductions in my dryland plots this year. If growers have access to irrigation, I would strongly encourage them to use science-based irrigation

scheduling approaches like those mentioned by Dr. Porter in this newsletter. Waiting until the crop is already visibly stressed can be costly.

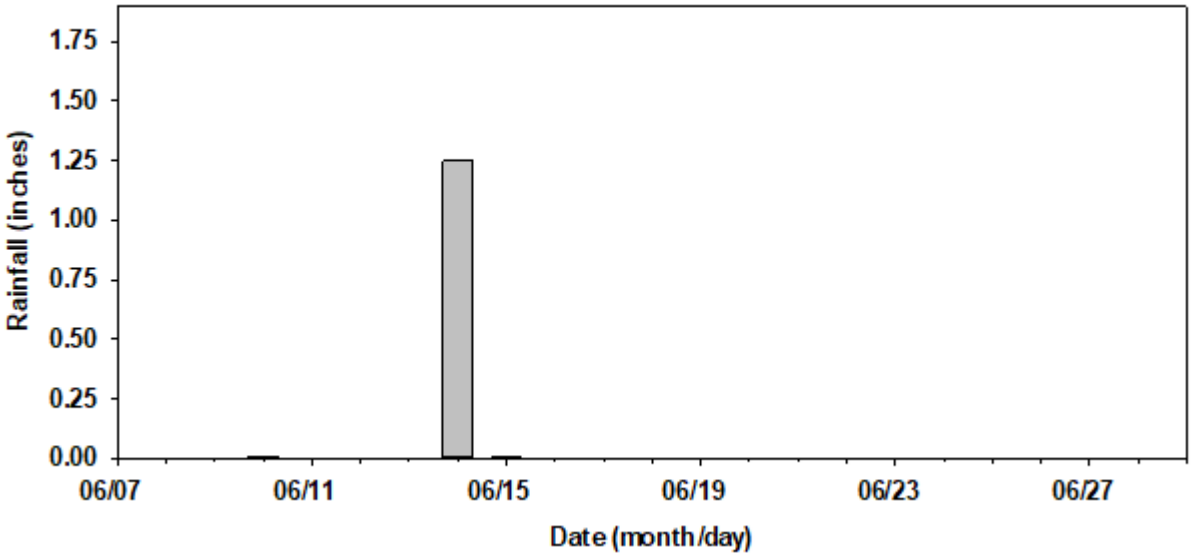


Figure 2. Daily rainfall in inches from June 8 to June 28 (squaring to first flower) for cotton that was planted near the end of April in Camilla, GA.

Figure 3. Dryland (A) and irrigated (B) cotton at C.M. Stripling Irrigation Research Park in Camilla, GA. Note severe wilting and lack of a closed canopy in (A).

July Weather and Climate Outlook (*Pam Knox*): In the month of June, drought increased across Georgia significantly, going from just 9% at the end of May to 54% by the end of the month. Many of you have told me you think even that is an underestimate of how bad things are. One of the problems with the Drought Monitor's depiction of drought is that they are required to make a single map that balances both short- and long-term water deficits, and that does not reflect the rapid changes we see in water availability for plants, especially in our sandier soils with very high temperatures.

Fortunately, we have switched from the dome of high pressure that suppressed most showers to a more typical summertime pattern with humid air and frequent afternoon thunderstorms. Rainfall from those showers can be spotty and I know it is frustrating when it rains a mile away while you get nothing, but hopefully over time the moisture will spread around the area as the storms come and go. A few areas have even received above-normal rainfall in the last 30 days, but most of the state got less than they expected, which is especially tough when temperatures are so high. The outlook for July shows that temperatures are expected to be warmer than normal but there is no indication at this time that we are going to see very hot conditions. Precipitation is also expected to be wetter than normal, with early July seeing wetter conditions and then dropping into a drier pattern by mid-month. There will be some dry days scattered in, so you should be able to get into the fields to work, just watch your local forecasts for timing. That is also the expected pattern for July through September, so at least for now no big pattern shifts are expected.

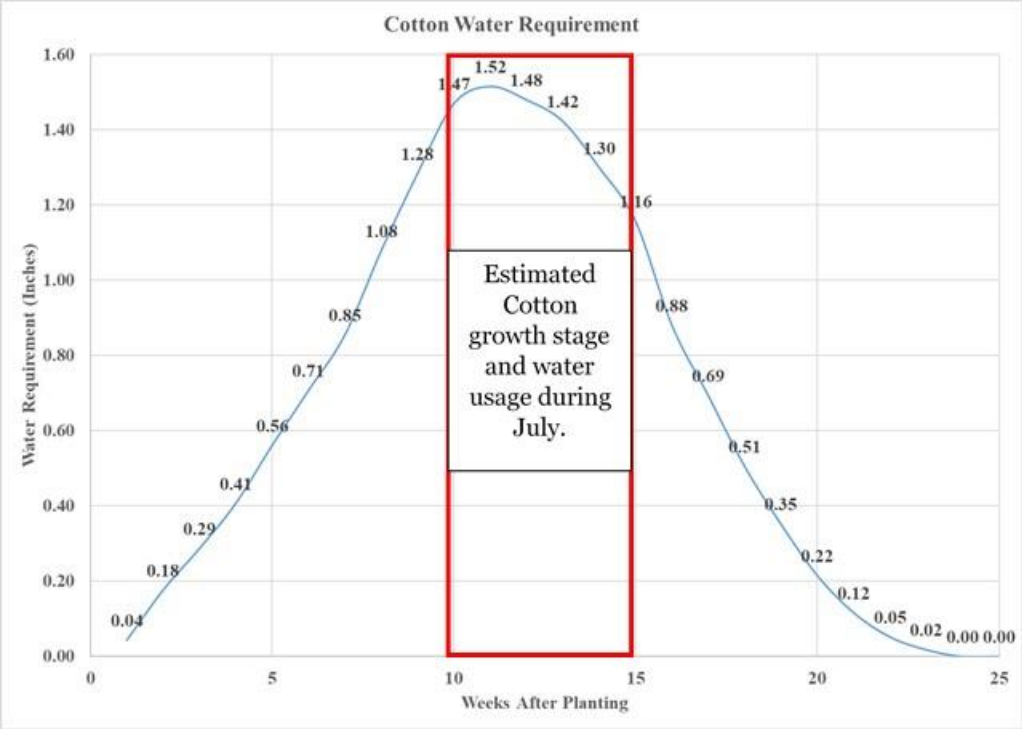
The tropics gave us a surprise with Tropical Storm Colin, which formed from a low that tracked up along the East Coast and formed briefly over South Carolina before dissipating in North Carolina less than 24 hours later. Colin did bring some showers to eastern parts of Georgia and did not have enough wind to do much damage, especially since the strongest part of the storm stayed offshore. The long-range models do not show much tropical activity for at least the next couple of weeks, so that should not be a big concern for the first half of July. The main season really does not get going until mid-August, so there is plenty of time for the tropics to impact us later this summer.

July Mid-Season Cotton Irrigation Considerations (*Jason Mallard, David Hall, Wesley Porter*): To say June was hot and dry would be a huge understatement. Perhaps some of the highest evapotranspiration rates were noted during the end of June. Thankfully, at current writing, rainfall chances have become spotty but chances are still favorable for rain and cooler temperatures moving into early July. As we are moving into peak water demand for cotton and experiencing the relentless heat from a few weeks back, provides an excellent opportunity to discuss a valuable resource available to all. Go online and search UGA Weather stations to see data like daily evapotranspiration. The evapotranspiration rates during the end of June were amazingly high. Just pick a site and enter a timeline on the water balance tab. It should be noted that the weather station reported Evapotranspiration is not direct crop water usage. To obtain current crop water usage ET must be multiplied by the current crop coefficient. This is how the UGA Extension Checkbook method was developed. It was created based off historical ET rates and crop coefficients, therefore there is a good chance the water being applied may be insufficient or perhaps slightly excessive due to the current year's conditions. Please keep this in mind when irrigating crops, especially during hot, high west winds and low humidity environments. It is a good tool but soil moisture sensors or apps are far superior in irrigation scheduling.

Cotton that was planted during May in Georgia should be squaring by now and approaching bloom, if it hasn't already began blooming. Bloom occurs roughly 9 weeks after planting and water requirements really ramp up and approach peak demand during this time. Irrigation requirements and demand are very critical during the "First flower to first open boll" period of development. This growth stage takes place during weeks 9-17 after planting. Thus, based on when your cotton was planted, you will probably enter peak demand during the month of July. During this stage, cotton may require up to 1.5 inches **per week** or 0.2 inches **per day**. Keep in mind that the Soil Water Holding Capacity of most of our soils is around 1.0 inches/foot of soil. The crop can only access water where it has roots and of this SWHC only about 50% of it is plant available. Thus, a cotton plant with an 18-inch rooting depth will have access to 0.75 inches of water at field capacity, meaning it will require irrigation every 3 to 4 days minimum based on rainfall and irrigation efficiency during this stage. It is important not to let your cotton crop experience water stress during the flowering stage, as stress during this stage can reduce plant growth which in return can reduce the number of fruiting sites that are initiated.

The main thing to keep in mind is that these water requirements are based on a historical average and that the crop may not necessarily need or use the amount of water as shown in the graph below. If you have cooler and cloudier or more humid days, your crop may not use nearly as much as it would if it would on a hot, sunny, and dry day. The graph below should give you a good idea of your weekly water requirements through the month of July **IF** you planted between mid-April and mid-May.

If you are using sensors for irrigation you will typically notice that during July, water usage occurring from the deeper sensor depths. This usually happens pretty rapidly and unexpectantly. The ramp up in water use will occur sometime during peak bloom, usually around weeks 3-6 of bloom. It is important to monitor the crop and soil moisture moving into this stage and make sure that you do not fall behind on irrigation putting the crop into potential stress during bloom. It is very hard to replenish deep soil moisture with irrigation alone. Thus, falling behind moving into peak water usage will make it very difficult to "catch-up".



Additionally, over-irrigating cotton will cause yield reductions. Thus, it is important to follow a good irrigation scheduling strategy that recommends irrigation when it is needed. For more information on irrigation scheduling for cotton contact your local UGA County Extension Agent, general water use curves can be found at: Irrigation Reference Guide for Corn, Cotton, Peanuts, and Soybeans | UGA Cooperative Extension.

Staying In-Tune with the Cotton Crop: The PGR Decision (*Camp Hand*): Cotton is a dynamic crop. I was walking a field with someone last week that has experience in other crops but hasn't worked much cotton in the past. I told them that in many crops, most management decisions are made at planting or based on a calendar. Not cotton in most cases. I told them, "The cotton plant is talking to you, you have to know what it is saying and respond accordingly."

I enjoy music. Listening to it, playing it, all aspects. Those that read my excerpts from "Specialists Speaking" in Cotton Farming magazine already know this. In high school I was a "band nerd". Say what you will about band nerds, but I got to travel Europe for 3 weeks playing music so it was a pretty good deal. Once I graduated high school I began playing in my church's worship band (Embrace Church in Auburn, AL). Whether it was French horn in high school, or acoustic guitar/steel guitar/electric bass/drums at church, we always rehearsed ahead of time and made sure our instruments were in tune before we began playing. When I listen to music now, particularly live music, it is easy for me to tell when someone in a band gets off beat or is out of tune. It doesn't sound good and it makes me cringe a little. But when everyone is in tune and they have practiced, that's the kind of music that makes you want to tap your foot, sing along, or maybe even dance.

Why am I talking so much about music in the cotton team newsletter? All management decisions that have been made to this point for this crop will affect decisions growers make for the rest of the season. So we need to be "in-tune" or "in-sync" with the crop. Kind of like when a band rehearses and they are in tune, when all aspects of management in a cotton crop are working together, it can be a beautiful thing.
Of course, in my wheel house right now, one of the number one questions I am getting from county agents is about plant growth regulators (PGR). So how can we make sure that the PGR decision is working together with previous management decisions? There are a few things that have happened to this point of the season I would be thinking about:

1. Seeding Rate – There was a lot of talk coming into this season about reducing seeding rates for one reason or another. This decision also impacts the intensity of a PGR management strategy. Generally, past research has demonstrated that lower plant populations need less growth management. The increased light penetration in the canopy increases fruit retention, which as we all know, high fruit retention is the best PGR.

2. Variety – When a county agent calls me about PGRs, nine times out of ten the first question I ask is which variety is it. Cotton varieties have different levels of responsiveness to PGRs. For example, if I get a call that a grower is thinking about spraying PGRs but it's right on the fence as

to whether the field needs it or not, and then I find out the grower planted an extremely aggressive variety (i.e. DG 3799 B3XF or DP 2055 B3XF), then I would say pull the trigger. Whereas if the variety is more responsive to PGRs/less aggressive (i.e. NG 4936 B3XF or PHY 400 W3FE) I might hold off.

3. Planting Date – This one is interesting. Historically in Georgia, there has been little yield benefit observed from a prebloom PGR application when cotton is planted in May. However, when cotton is planted into June, a prebloom application increases yield. PGRs hasten cutout, so more aggressive strategies (i.e. prebloom applications) should mature our crop faster. This is extremely beneficial in our late planted cotton, to make the most of the little time we might have.

4. Fertility – There was also some talk coming into the season about cutting fertility, specifically nitrogen. This also has an impact on the PGR decision. Generally speaking, we tend to push the gas pedal with nitrogen and tap the breaks with PGRs in our cotton crop. So, if you ease your foot off the accelerator, you hopefully won't have to slam on the brakes.

5. Insect Pressure – There have been some reports of plant bugs throughout Georgia, and I know of a handful of fields that have been sprayed. Plant bugs tend to feed on small squares, which eventually fall off the plant. This goes back to the earlier conversation about fruit retention being the best PGR. If insects are the reason for a decrease in fruit retention, that should be corrected first, but then evaluate for the need of a PGR application. Extreme fruit loss can cause the cotton plant to start growing again in an attempt to compensate for that loss, which may warrant a PGR application.

There are many other things that play into a PGR decision outside of these points, like whether a field is irrigated or dryland, as well as the history of that field and if there is a tendency towards rank growth. But these are just a few of the major things going on around the state that play into the PGR decision.

The best thing a grower could do for their crop right now is to walk their fields and stay "in-tune" with what is going on in their crop. The last thing we want to do this year is to be growing a crop as if we were playing music off beat or out of tune. We need to work with the crop, playing the kind of music that makes you want to sing along. The cotton plant is talking to you, you just have to know what it is saying and respond accordingly. If you ever have questions or need anything, your local UGA county extension agents and specialists are here to help! Don't hesitate to reach out.

Foliar Disease Considerations (*Bob Kemerait*): Historically, once cotton was planted and had progressed beyond the threat of seedling diseases, there were few management options for growers to consider. The lack of management options was for two reasons, the first being that there was no "silver bullet" for boll rots, Stemphylium leaf spot, or nematode problems. The second reason was that, unlike in peanut production, there were not fungal diseases for which a fungicide was effective in reducing losses. That has

changed over the past 15 years where now target spot, caused by *Corynespora cassiicola*, and areolate mildew, caused by *Ramulariopsis gosypii*, are recognized to cause significant yield loss and that this yield loss can be managed with the judicious use of fungicides.

Target spot and areolate mildew will not occur in every cotton field in Georgia every year. When they do occur "early enough", repeated research trials have shown that a) significant yield loss can occur due to these diseases and that b) timely fungicide applications can protect against, but not eliminate, yield loss.

The most effective way to manage target spot and areolate mildew is to apply a fungicide preventatively, that is before the disease is established in the field. To date, use of a fungicide has not been justified to manage either disease prior to the first week of bloom, and often not until the third week of bloom and beyond. Fungicides applied "preventatively" but too far ahead of disease onset are unlikely to protect yield or to minimize impact of the diseases when (and if) they occur. For this reason, UGA Extension recommends that growers should be prepared to apply a fungicide to their cotton crop as early as the first week of bloom, but to scout the field and to hold off from the initial application until disease is found. In scouting the field and applying fungicide only when disease is found allows the growers to do three things. First, the fungicide is applied when disease is known to be present. Second, delaying the initial fungicide application may eliminate the necessity for a second application. Third, where disease never develops, or develops late in the season, delaying a fungicide application until disease is observed may determine that a fungicide was not needed in that field in the current season.

Because of a history of target spot in well-managed, irrigated cotton fields with high yield potential, some cotton growers will automatically make a fungicide application to minimize risk to disease. In such cases, UGA Extension recommends that this fungicide application be made at the third week of bloom, unless disease is detected earlier. Applications for areolate mildew should be delayed until either the disease is observed in the field, or the disease is found present in fields nearby.

Yield loss for early development of target spot is generally between 100 and 250 lb/lint per acre between treated and untreated plots. Yield loss to early development of areolate mildew can be as much as 300 lb/A. Currently there are three fungicides that are tested and recommended for management of target spot and areolate mildew on cotton in Georgia. These include azoxystrobin (Quadris and other products), Priaxor, and Miravis Top. For management of target spot, Priaxor and Miravis Top are almost always more effective than are applications of azoxystrobin. When areolate mildew is the threat, Priaxor and Miravis Top provide better control than azoxystrobin, but the difference in yield between products is smaller than it would be for target spot.

Growers should consider protecting their cotton from target spot until the 6th week of bloom. Growers should consider protecting their cotton crop from areolate mildew until within 28 days of planned defoliation. Once premature defoliation has reached 20% or more, it is unlikely that a fungicide application will be beneficial. Target spot is less likely to develop under current very hot and dry conditions because of the extended leaf wetness period (approximately 12 hours) that is needed for infection to occur. However, the high humidity low in the canopy of a well-irrigated, high yield cotton crop may still allow target spot to develop.

The keys to managing both areolate mildew and target spot are timely applications of effective fungicides. Initiation of a fungicide program to manage either (or both) of these diseases is best based upon results from careful scouting of your cotton fields.

Figure 1. Target spot on cotton.

Figure 2. Areolate mildew.

Figure 3. Stemphylium leaf spot.

Stinkbug Management (*Phillip Roberts*): Southern green and brown stink bugs are the two most common stink bugs infesting Georgia cotton. Based on stink bug populations in corn and reports of early planted cotton, stink bugs are likely to require management in many fields. Stink bugs have sucking mouthparts and prefer to feed on developing seeds in medium sized bolls. In addition to physical damage to the seed which impacts lint production, stink bugs may also introduce boll rot pathogens or create a wound on the boll which allows for pathogen infection. The most reliable indicator for stink bug injury is the presence of callous growths or warts on the inner boll wall and/or stained lint. Callous growths associated with feeding will form in less than 48 hours. As bolls mature and open, damage often appears as matted or tight locks with localized discoloration that will not fluff. Severely damaged bolls may not open at all. Research also suggests that in addition to yield loss, excessive stink bug damage can reduce fiber quality.

The best method for scouting stink bugs is to sample bolls which are the diameter of a quarter, ideally, we would like to sample one boll per acre in a given field. It is extremely important that bolls the diameter of a quarter (approximately 12

days of age) are sampled as these are the preferred feeding size. If larger bolls are sampled we are not sure when the damage occurred. Burst sampled bolls between your thumb and forefinger and peal the boll examining the inner boll wall for callous growths and staining. Bolls which have not been damaged by stink bugs will be creamy white and smooth. The three boll pieces on the bottom left of the photo are NOT damaged, whereas other pieces have been fed on by stink bugs. After examining all bolls for feeding injury calculate a percent of bolls with internal damage. During the first 7-10 days of bloom sample the largest boll available even if not the diameter of a quarter. If stink bugs feed on small bolls they may shed from the plant, so be sure to watch early boll retention. Small bolls damaged by stink bugs will be jelly-like inside.

A dynamic threshold which varies by the number of stink bug susceptible bolls present is recommended for determining when insecticide applications should be applied for boll feeding bugs. The boll injury threshold for stink bugs should be adjusted up or down based on the number of susceptible bolls present. Use a 10-15% boll injury threshold during weeks 3-5 of bloom (numerous susceptible bolls present), 20% during weeks 2 and 6, and 30% (+) during weeks 7(+) of bloom (fewer susceptible bolls present).

When selecting insecticides for stink bug control it is important to consider other pest such as whiteflies, corn earworm, aphids, or mites which may be present in the field. The objective is to control stink bugs but also to minimize the risk of flaring other pest which are present. A couple of bullet points below to consider when selecting a stink bug insecticide:

- Consider week of bloom and use the dynamic threshold.
- Pyrethroids provide good control of southern green stink bug but only fair control of brown stink bug (increased pyrethroid rates improve control of brown stink bug and bifenthrin generally provides greater control of brown stink bug compared with other pyrethroids).
- Determine ratio of southern green to brown stink bugs, organophosphates provide better control of brown stink bugs compared with pyrethroids.
- If whiteflies are present, use bifenthrin and avoid dicrotophos during weeks 2-5 of bloom.
- If corn earworm is present consider using a pyrethroid if brown stink bugs are low or using a pyrethroid tank mixed with a low rate of an organophosphate if brown stink bugs are most common.
- If aphids are present, include dicrotophos and avoid acephate if an organophosphate is needed.
- If mites are present, avoid acephate if an organophosphate is needed.

The situation is very serious with diuron (*Stanley Culpepper*): From the U.S. EPA: *"Based on the revised draft risk assessments and feedback submitted during the public comment period, EPA is proposing the following new measures to mitigate the ecological, dietary, and aggregate cancer risks of concern:*

- *<u>Terminate all herbicide uses on food and feed crops</u> to address dietary and aggregate risks of concern to the general public and ecological risks of concern;*
- *Revoke all food and feed tolerances to address dietary risks of concern to the general public (except for a single tolerance to support the remaining cotton harvest aid use)."*

Clearly, we are being placed in a very difficult dilemma with diuron. The importance of this herbicide for our cotton farmers is immeasurable. However, at the same time, not one of us wants to use a product that is unsafe for our applicators, the environment, or our consumers. The challenge is that the details being provided by the U.S. EPA AND diuron manufacturers is, let's say, beyond confusing! As we work diligently to understand the current available science and search for a potential solution, we must have our voices heard.

The end of the comment period for this decision is July 27, 2022. I would encourage each of you (farmers, consultants, etc.) to have your voice heard. The most important objective with comments at this time is for us to 1) define the importance of diuron to cotton production, 2) explain how the herbicide is used in Georgia cotton, and 3) communicate the lack of potential alternative options.

Consider making your comments through one of two potential avenues. Option 1: make a direct comment yourself (link below "submit comments") or Option 2: contact your local extension agricultural agent as our goal is to submit letters from various counties addressing the aforementioned objectives helping the U.S. EPA better understand diuron use in Georgia cotton.

Diuron PID: https://www.regulations.gov/document/EPA-HQ-OPP-2015-0077-0065
Submit comments: https://www.regulations.gov/document/EPA-HQ-OPP-2015-0077-0061

Goosegrass… is it kicking your butt??? (*Stanley Culpepper*): For years, we have been discussing how science suggests that goosegrass populations are likely to explode in cotton systems that are heavily dependent on Liberty or dicamba, especially when residual herbicides are not used wisely. This year it seems that science is proving to be correct with goosegrass issues more prevalent across our state.

This late in the season, there is little that can be done to control the huge goosegrass plants that have already escaped control but understanding how to improve the management program for the future will hopefully help. Keep in mind that those plants surviving in the field are likely producing seed that are more tolerant to Roundup (and other herbicides); thus, future management will be more difficult.

First to be successful, one must understand that goosegrass needs to be managed similar to Palmer amaranth……the goal is to never see an emerged plant. Starting clean by planting into fields free of goosegrass (and pigweed) is ideal. Herbicides such as Prowl (preplant/at plant) or Warrant (preemergence) are the backbone of a sound system. Prior to these herbicides breaking down, additional residual herbicides need to be applied thereby creating an overlapping barrier of control preventing emerged plants throughout

the season. Residual activity of Caparol, diuron, Dual Magnum, Outlook, Prowl, Treflan and/or Zidua will be beneficial as long as the product is activated prior to goosegrass emergence.

If (when) goosegrass emerges and is very small, an application of glyphosate + a grass herbicide (example being Select) is the best option. **Always use the full rate of Roundup and treat when goosegrass is less than 2 inches!** Making applications of Roundup + Liberty or Roundup + Dicamba will almost always provide much less control on this weed than that noted with Roundup alone. Understanding that follow up applications to control emerged plants are often not successful, special emphasis should be placed on a timely initial application.

Nutsedge, morningglory, spiderwort and grasses continue to gain ground in many cotton fields! (*Stanley Culpepper*): Without question, the Roundup + dicamba system has been extremely valuable to cotton producers throughout Georgia. Although the technology has provided many benefits to our farms, one of the greatest negatives is becoming very evident where these herbicides are relied upon too heavily. As a result, complaints regarding nutsedge, morningglory, spiderwort, and grasses have risen drastically. This result is primarily a response to timeliness, or lack thereof, and also by making the last herbicide application overtop of the cotton where the spray covers the crop but does not effectively contact emerged weeds hiding under the cotton or contact the soil providing residual control.

Layby applications will improve spray coverage of emerged weeds and the soil resulting in much better weed control, less cotton injury, and greater long-term farm sustainability. Diuron + MSMA (best for pigweed) or Roundup + diuron (best for grasses, 2nd best on pigweeds) are effective options. Add Envoke to improve morningglory and nutsedge control. For spiderwort, add Dual Mag, Outlook, or Warrant. Valor, Caparol, and Cotoran are also useful tools to be considered in a directed system.

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
J Phil Campbell Cotton Field Day – Watkinsville, GA – September 28, 2022
Georgia Cotton Commission Annual Meeting and UGA Cotton Production Workshop – January 25, 2023