UNIVERSITY OF GEORGIA EXTENSION

UGA Cotton Team Newsletter
June 2022

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June Mid-Season Irrigation Update (*David Hall, Jason Mallard, Wesley Porter*): The only thing for certain in farming is that there are no two years the same. May of 2022 brought us some very hot and dry weather. Some areas of our state had some brief relief from the dry weather during the last week of May, however, this was not the case everywhere and even this little bit of rain and soil moisture did not last long when the hot and dry conditions returned. While we typically do not need to irrigate cotton during the first month or so after planting, conditions without rainfall may require irrigation to promote seed germination and emergence, or to relieve some heat stress.

Earlier planted cotton will be moving closer to first flower by the end of June. Thus, staying on top of water requirements will become critical throughout the month of June. Additionally, even later planted cotton may need some irrigation to ensure there is enough soil moisture available for the crop. Remember, that if there is no rainfall, the water requirements need to come from somewhere, in this case irrigation. Our Irrigation Reference Guide for Corn, Cotton, Peanuts, and Soybeans | UGA Cooperative Extension shows estimated water requirements in both days after planting and estimated growth stage, based on the physiological progression of the crop it may be better to look at the growth stage and not the DAP. Now is a good time to review the cotton irrigation schedule, determine where you currently are and decide what your water requirements are.

Cotton Irrigation Schedule

Growth Stage	DAP	Weeks after Planting	Inches/Week	Inches/Day
Emergence	1 - 7	1	0.04	0.01
	8 - 14	2	0.18	0.03

Emergence to First Square	15 - 21	3	0.29	0.04
	22 - 28	4	0.41	0.06
	29 - 35	5	0.56	0.08
First Square to First Flower	36 - 42	6	0.71	0.10
	43 - 49	7	0.85	0.12
	50 - 56	8	1.08	0.15
First Flower to First Open Boll	57 - 63	9	1.28	0.18
	64 - 70	10	1.47	0.21
	71 - 77	11	1.52	0.22
	78 - 84	12	1.48	0.21
	85 - 91	13	1.42	0.20
	92 - 98	14	1.30	0.19
	99 - 105	15	1.16	0.17
	106 - 112	16	0.88	0.13
	113 - 119	17	0.69	0.10
First open boll to >60% Open Bolls	120 - 126	18	0.51	0.07
	127 - 133	19	0.35	0.05
	134 - 140	20	0.22	0.03
	141 - 147	21	0.12	0.02
	148 - 154	22	0.05	0.01
	155 - 161	23	0.02	0.00
Harvest	162 - 168	24	0.00	0.00
	169 - 175	25	0.00	0.00

Based on planting observations and where most of the crop is, most farmers should fall within the first square to first flower stage (or the yellow highlighted area) throughout the month of June. If you were unfortunate and did not get your cotton planted until later May or early June then you will fall into the emergence to first square stage (highlighted in red). Crop water requirements increase dramatically from squaring and flowering. From 30 days to 50 days after planting, water consumption almost doubles. Keep this in mind as we move into middle and late June, and into early-July. Don't fall behind on your irrigation once the crop reaches squaring and into flowering. As a reminder don't forget that typically as water use increases is in late-June through July, usually so does very hot and dry weather, so keep this in

mind and stay on top of your irrigation applications. Conversely, don't over-irrigate the crop as there are yield penalties for doing so. Please keep in mind, if you have been using soil moisture sensors and you have "weighted" your sensors as discussed in the last newsletter, do not forget to change the weighting to reflect current crop water use in the profile. Root growth has dramatically increased downward and we now need to be more balanced with our sensor readings.

One last consideration, top dressing all cotton and our first dose of growth regulator on aggressive irrigated growing cotton will soon or has already taken placed. Don't go into this stage with the mindset of "I'm going to hold back on the water now because I don't want it to take off". If proper growth regulator is applied, it will prevent vegetative growth as it should. If rain chances are low, irrigation will be required to get the fertilizer in the plant by irrigating it in and allowing the plant to uptake the nutrients.

June 2022 Weather and Climate Outlook (*Pam Knox*): Over the past month, the temperature across the Southeast has been warmer than normal in almost all locations. Rainfall has been variable, with bands of wet and dry conditions across the region due to the impacts of slow-moving fronts that have concentrated precipitation in some places while leaving others high and dry. The Drought Monitor has shown this with an increase in dry conditions depicted until late May but some decrease since then as rain has become more frequent.

The outlook for June and July is for warmer than normal temperatures to continue for most of the next six weeks, although it will not be as outrageously hot as the drought regions out west and will have some breaks with cooler weather interspersed. Precipitation is expected to be fairly dry through early June with some daily thunderstorm activity scattered around the region. Rainfall is expected to pick up in mid-June for a week or two before dry weather returns to the region through mid-July. If you are applying field treatments that depend on the absence or presence of rain, you will want to watch the forecasts carefully to make sure you find the right timing. If the dry conditions in late June and early July do occur, I expect to see an increase in drought conditions since the warm temperatures will also increase water stress.

The first real tropical activity of the year was the Potential Tropical Cyclone #1 that just traveled through southern Florida, dropping as much as 15 inches in some locations in Miami and surrounding areas. Just a few areas in coastal Georgia received any rain from the outer bands of this storm, and most of us were sunny and dry. PTC#1 did not develop a closed circulation and so was not given a name, but after it gets back out over water and the warm Gulf Stream, it will likely be named Alex as it tracks off to the east away from the US. Just shows that it does not need to be a named storm to cause a lot of damage if it hits near you, and rain can be as much of a problem as high winds!

There is nothing else brewing in the tropics right now, but the Gulf of Mexico is warmer than normal and that is the prime tropical development region in June and July, so we could see more action later in June. The GFS model is hinting at another Gulf storm around the 3rd week of June, but it often does that far in advance. Most of the time, those predicted storms do not come to fruition, so don't get too excited if people post dire maps of hurricanes at hour 360 on social media, since they are usually just a single model

without much support from other predictions. If a storm does develop, it will likely be in plenty of time for you to react as long as you are watching the forecasts regularly.

La Nina is still hanging on in the Eastern Pacific Ocean and has gotten a little colder, which means it will likely continue through the summer. That will enhance the storm activity in the Atlantic, making this another active year, as predicted. But of course, it really only matters if it comes near you, so be prepared but not worried at this point. The start of the season is a great time to make sure you are ready so that if a storm does head for you, you have planned what to do and have all your documentation in order.

Sprayer Considerations (*Simer Virk, Eric Prostko, Wesley Porter*): As growers shift their focus from planting to crop management, it is important to be timely and effective with pesticide applications to stay on top of pest and disease control throughout the season. Achieving desired spray coverage and efficacy while keeping off-target movement of pesticides to a minimum can be challenging but an important consideration for us to continue using these valuable pest management tools in the future. Spray applications resulting in under- or over-application of pesticides, ineffective coverage, or off-target movement can have serious consequences. Below are several things to consider to help keep the product on target when applying pesticides safely and efficiently with boom sprayers:

Nozzle Selection: Nozzle type affects sprayer output, uniformity, coverage and drift. Make sure to check pesticide labels for recommended application rate, droplet size, and conditions needed to safely apply the pesticide. Consult the manufacturer's nozzle catalog for selecting the nozzle that provides the desired output (flow rate and droplet size) specific to the application. Nozzle selection will also depend on the ground speed and pressure required to achieve the rate in gallons per acre.

Spray Pressure: Spray pattern and droplet size changes with pressure. Lower pressures result in larger droplets whereas higher pressures produce smaller droplets for a given nozzle size. Based on the application (whether coverage or drift control is necessary), consider selecting a nozzle that provides the required droplet size in 30 – 50 PSI pressure range. Spray operation at both excessively low and high pressures results in non-uniform spray angle and pattern.

Ground Speed: Application speed plays an important role in achieving the desired application rate. A higher travel speed will require a higher nozzle flow rate to achieve the given application rate and vice-versa. It is recommended to reduce the sprayer speed (less than 10 mph) to obtain a consistent and more uniform coverage. Faster speeds will cause excessive boom bounce sending finer droplets higher in the air and increasing potential for drift.

Boom Height: Boom height influences overlap and uniformity of spray application at a selected nozzle spacing and spray angle. Lower boom height (20 – 30 inches from the target) is generally recommended for maintaining a proper spray pattern and overlap to achieve satisfactory coverage while reducing drift.

Environment: Weather conditions such as wind speed and temperature also play a role in achieving the desired spray coverage and on-target application. High wind speed affects spray coverage and also results

in greater drift. Wind direction should be also considered to avoid spraying towards sensitive crops, homes, etc. Warmer temperatures also increases drift especially at higher boom heights. To minimize off-target movement, avoid pesticide applications when conditions for temperature inversions are favorable.

Sprayer Calibration: Proper sprayer calibration is important to verify the nozzle output (gallons per minute) and consequently application rate (gallons per acre) based on the selected ground speed and nozzle spacing. During calibration, make sure to check all the nozzles for application uniformity across the whole boom, and for any leaks or uneven spray patterns.

Spray Technology: Spray technologies such as rate controller and section or individual nozzle control can be utilized to minimize variations in application rate and coverage. Advanced technologies such as PWM (pulse width modulation) nozzle technology and automatic boom height control is also currently available for use on spraying equipment for better application control and drift reduction.

Crop Monitoring and Management (*John Snider, Ved Parkash, Gurpreet Virk, Camp Hand*): Most of the cotton crop has been planted by now. The crop planted in late April or early May should be at the squaring stage soon after this newsletter comes out. As mentioned in the last newsletter, utilization of crop monitoring and management tools is an important component of any cotton production system. Each year, cotton faces unique challenges affecting growth and development. Thus, crop management decisions are highly dependent on prevailing conditions, and we should not broadly assume that what worked or did not work last season will have the same effect this season. As a result, it is important to actively engage in crop monitoring for cotton and make management decisions based on developmental trends. Cotton growth monitoring should be started when the cotton plant is at the 8 to 10 leaf stage. There are a number of indices that can be used as tools to monitor crop development and make management decisions such as measuring plant height, node development, counting the number of nodes above white flower (NAWF), internode length, and height to node ratio.

Plant Height: Multiple attempts have been made by researchers to identify the ideal plant height in cotton. However, early in the season, plant height is influenced by a number of different factors such as temperature, rainfall, fertility, variety, row spacing, and plant density. Therefore, plant height alone is not the best indicator of crop vigor. According to the cotton production guide, an ideal plant height is generally around 44 to 50 inches by the end of the season, but this can vary substantially. Another way to assess plant vigor is by measuring the length of top five internodes which can be used as an indicator of main stem elongation rate. The average internode length can be useful when the increase in plant height is constant (not increasing or decreasing) in order to determine the need for PGR applications.

Node development: Nodes are the points of attachment of leaves and branches to the main stem. As a general rule, it takes 3 days to develop a node under optimal environmental conditions. Another way to look at the rate of new node development is that approximately 50 DD60's are required to produce a new node. Thus, temperature can have a pronounced effect on the rate of development. Therefore, depending upon temperature, the development of a new node could take as little as 2 days under high temperature

conditions to as much as 10 days under low temperature conditions. The cotton plant will produce its first fruiting branch on node 6 ± 1.

An ideal cotton plant will have about 21 to 23 nodes by the end of the season. The number of mainstem nodes above a first position white flower (NAWF) could potentially be indicative of growth limiting stress, high plant vigor (horsepower), or poor fruit retention, depending on seasonal trends.

Nodes Above White Flower: NAWF is an indicator of the status of intra-plant competition between vegetative and reproductive growth. Values ranging from 9 to 12 squaring nodes above a first position white flower at first flower are indicative of ideal to vigorous vegetative growth. A low number of NAWF at first flower (i.e. 5) suggests poor vigor and 12 or more NAWF at first flower indicates vigorous or even excessive vegetative growth. With the onset of flowering and boll growth, NAWF should decrease as long as plants are retaining fruit, and when only 3-5 NAWF are left, this point is called cutout (Bednarz and Nichols, 2005). This represents the end to new vegetative growth by the cotton plant. Simply by measuring NAWF, growers can determine the balance between vegetative and reproductive growth and make management decisions accordingly. Figure 1 below is from Guthrie et al. (1993) and shows different trends in NAWF. A rapid decline in NAWF as shown in A and B curves of Figure 1 suggests a reduction in terminal growth due to rapid boll loading. The ideal situation is represented in (A), where the plant has good vegetative growth early on and then shows a rapid decline due to high fruit retention. The results presented in (B) are indicative of stress, where plant starts with a low number of NAWF, and then reaches cutout prematurely. However, curves C and D indicate vigorous growth, but the lack of a consistent downward trend in NAWF may suggest that insect pests or some other stress is limiting fruit retention required to constrain new vegetative growth.

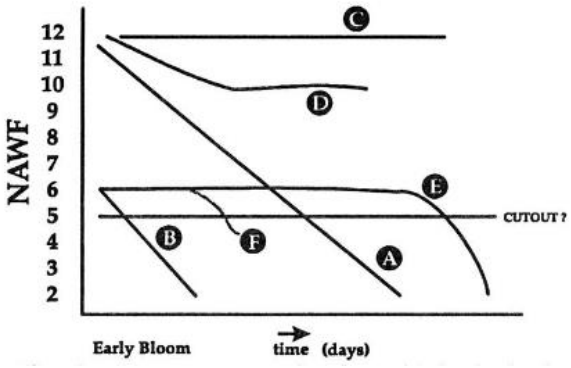

Figure 1: Different seasonal trends in NAWF reduction with growth (Guthrie et al., 1993)

Internode length: The portion of the mainstem between two consecutive nodes is referred to as the internode. Once the grower starts making PGR application decisions (particularly after early flowering), a long internode (3-5 inches) suggests conditions are favorable for plant growth with a potential for rank growth. A short internode (1.5-2 inches) suggests the crop may be under stress, and a moderate internode length (2-3 inches) indicates that vegetative growth is adequate. The measurement of internode length between the fourth and fifth internode from the terminal is usually the best indicator of plant growth as cell elongation stops at lower nodes.

Height to node ratio (HNR): Height to node ratio is calculated by dividing the plant height by the total number of mainstem nodes. Figure 2 shows height to node ratio values for a non-stressed, high yielding cotton crop at a given stage of development (i.e. total number of mainstem nodes). Growers can use information to compare with their crop's development and make management decisions based on it. A low HNR indicates relatively low vigor and there is a need to put effort into relieving growth-limiting stress (water, nutrients, etc.). A high HNR indicates excessive vegetative growth and that there is a need to consider plant growth management inputs.

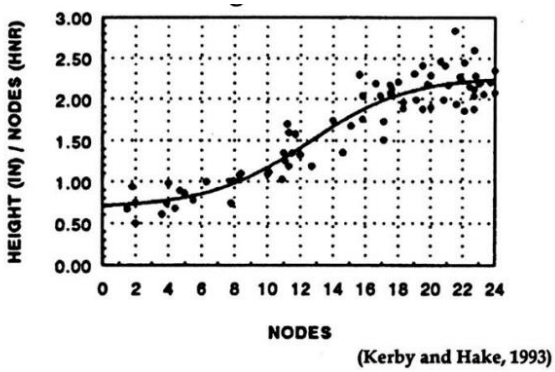

Figure 2. A benchmark data set indicating an ideal height to node ratio at a given stage of plant development (total number of mainstem nodes).

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Agronomic Update (*Camp Hand*): Well, each growing season is unique and this one has been no exception. We haven't been catching as many rains on much of the station, but I am always glad to hear that other parts of the state are getting much needed rainfall. But prior to sporadic rain showers, it had gotten extremely dry. How dry you ask? Below is a conversation that happened between myself and Tucker Price, Cook County ANR Agent, approximately three weeks ago:

Me: "Hey Tucker, how's it going?"

Tucker: “Pretty good Camp, how about you?”

Me: “Can’t complain. What’s going on?”

Tucker: “Well, it’s so dry the nutsedge is dying!!”

That is about when I knew we needed a rain and needed one bad. Luckily since then there have been a couple of fronts come through as well as the usual “pop-up” shower that happens some afternoons. This has greatly helped us close the gap in planting, as the USDA crop progress report has us at approximately 86% planted as of June 6, which puts us a little ahead of the five year average.

In my drives across the state, from what I have seen, the crop looks to be in really good shape thus far. I think we are positioned for success as of right now. The major thing I have been getting calls on is replants. Of course at this point, it might be a “take what you get” type situation. But even the “poor” stands I have been called to look at aren’t all that bad. There are definitely situations that have warranted replants this year, but for the relatively harsh planting conditions we have had I think we are in really good shape. If you are toying with the idea of replanting your crop, remember – top end yield can still be achieved at a final stand of one plant per foot, evenly spaced. If you decide to replant, keep in mind plantback intervals for residual herbicides that were applied PRE or POST, and also remember we are starting to come to the end of the planting window here in Georgia.

USDA also reported that 8% of our crop is squaring as of June 6. I applied some squaring treatments to cotton that was planted May 3 this morning (June 7), so we might be a little further along than the reported number. With that, there’s a couple of things I would be thinking about if my cotton was beginning to square. The first is nitrogen fertility. If preplant nitrogen rates were reduced or eliminated, it is of the utmost importance that sidedress nitrogen be applied in a timely manner. Dr. Glen Harris recommends that sidedress nitrogen go out closer to first square than first bloom if there was little to no preplant nitrogen utilized. Timeliness is key. Secondly is growth regulators. I am already starting to get questions about PGR applications on cotton, and on our early planted, irrigated ground with an aggressive variety, prebloom applications will be necessary. Keep in mind that with PGRs, timing is more important than rate (i.e. lower rates early in the season work better than high rates late in the season).

I hope everyone safely wraps up planting in the coming weeks. As always, if you have any questions, don’t hesitate to reach out. Your local UGA County Extension Agent and specialists are here to help!

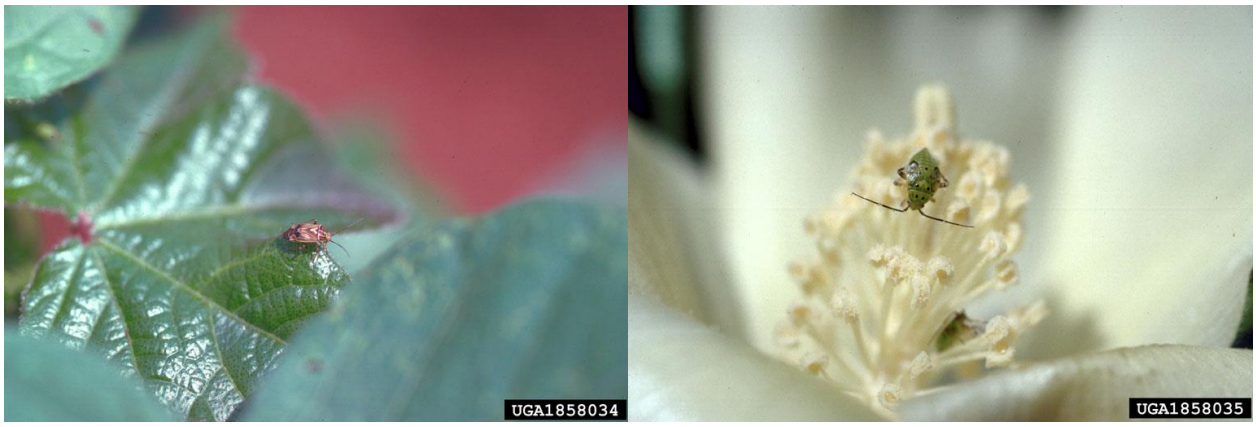
Tarnished Plant Bug Management (*Phillip Roberts*): Tarnished plant bug is an occasional insect pest of cotton in Georgia. Primary damage caused by plant bugs is feeding on small squares in plant terminals. However, plant bugs may also feed on large squares, small bolls, and terminals. Plant bugs insert their needle like piercing sucking mouthparts into fruiting forms and feed on the plant juices. After a pinhead square has been damaged, it turns yellow to brown or black and easily falls from the plant when touched. Healthy undamaged squares will be firmly attached to the plant. When the square is shed by the plant, an

elliptical scar where the square was attached remains. No visible damage is apparent on the outer surface of squares damaged by plant bugs. Plant bug feeding in the terminal may alter the physiology and result in a malformed plant. Large squares which are damaged will often remain on the plant and appear healthy and normal, however when the square blooms the flower will have warty growths on the petals and darkened anthers. This type of flower damage is referred to as a "dirty bloom". Plant bugs may also feed on small bolls. Excessive feeding may cause boll shed, but most often localized lint and seed damage is the result. Callous warty growths on the inner surface of the boll wall will often form near the feeding site (appears very similar to stink bug damage).

Square shedding due to tarnished plant bug feeding (left) and a dirty bloom resulting from tarnished plant bug feeding on a large square. Images by Ron Smith, Auburn University, Bugwood.org.

It is important that we scout all fields and use thresholds. Insecticide should only be used if thresholds are exceeded since beneficial insect populations will be disrupted with plant bug applications. During 2021 we estimated that 30 percent of the cotton in Georgia was treated for plant bugs. Our goal with a plant bug management program is to retain at least 80 percent of first positions when we enter bloom.

Adult tarnished plant bugs are about ¼ inch long with a general brown color mottled by patches of white, yellow, reddish-brown or black. A light-colored "V" on the scutellum (behind the head) and two light-colored patches further back on the wings are characteristic. Eggs are about 1 mm long and are almost always embedded into plant tissue, and thus not easily found. Immature tarnished plant bugs typically vary from yellowish-green to dark green or brownish. Early instars can look like an aphid, but tarnished plant bug nymphs run quickly whereas aphids are docile and move very slowly. Later nymphal instars have four dark-colored spots on their thorax and one spot in the middle of the abdomen. Plant bugs have a large host range and survive the winter as adults on wild host plants. Females lay 50-150 eggs which hatch in 7-12 days and nymphs develop into adults in 15-25 days.



Tarnished plant bug adult (left) and nymph (right). Images by Ron Smith, Auburn University, Bugwood.org.

Scouting plant bugs can be accomplished by monitoring square retention and being observant for plant bugs, using a sweep net (pre-bloom), using a drop cloth (after bloom), or preferably a combination of monitoring square retention and sampling for plant bugs.

Square retention counts should be made once cotton begins fruiting and continuing into the 2nd week of bloom. As we get further into bloom, square retention is a less reliable indicator of possible plant bug feeding due to natural square loss for various reasons. To make a square retention count gently pull the top two main stem leaves apart and look for the presence or absence of a small square. Typically, we teach scouts to monitor a single fruiting site per plant. The threshold is when plants are retaining less than 80% of small squares and plant bugs are observed. It is also a good idea to randomly pull plants in the field to monitor overall square retention. Again, our goal is to maintain 80 percent of all first positions when we enter bloom. Plants with 80 percent first position square retention at first bloom still have maximum yield potential.

Sweep nets (15-inch diameter) are a good tool for monitoring plant bug adults on squaring cotton. Adult plant bugs are elusive, so walk quickly when sweeping. Drop cloths are the preferred sampling tool in blooming cotton and are much more effective in detecting plant bug nymphs.

Plant Bug Thresholds:

First two weeks of squaring:
Sweep Net: 8 plant bugs per 100 sweeps
Drop Cloth: 1 plant bug per 6 row feet

Third week of squaring through bloom:
Sweep Net: 15 plant bugs per 100 sweeps
Drop Cloth: 3 plant bugs per 6 row feet

Insecticides recommended for plant bugs include Orthene, Bidrin, Admire Pro, Diamond, Vydate, Transform, and Centric. A few comments on each:

Orthene and Bidrin are organophosphates. Orthene is very active on plant bugs, however it is also is hard on beneficial insects and tends to flare spider mites. Orthene does not have activity on aphids and would likely exacerbate aphid populations if present. Bidrin is also very active on plant bugs and hard on beneficial insects. The Bidrin label only allows higher use rates such as 4-8 ounces per acre from first bloom to 30 days prior to harvest. Bidrin will provide some control of aphids. Delaying use of Orthene and Bidrin until later in the season (after bloom) is advisable.

Transform is very active on plant bugs and provides good control of aphids and is not as hard on beneficials as the OPs. Centric provides good control of plant bugs and decent but sometimes erratic control of aphids. Both of these products would be good choices when targeting plant bugs on squaring cotton. Admire Pro (imidacloprid) has some activity on plant bugs and some activity on aphids and would not be the treatment of choice if plant bug populations were high. Vydate provides fair control of plant bugs and has little to no activity on aphids.

Diamond is an insect growth regulator and is only active on immature plant bugs. Diamond will not control adults. Diamond is used on many acres in the Mid-South where plant bugs are an annual problem. Diamond performs best when applied before the situation is out of control. If you have fields where high adult populations have been observed and nymphs are starting to be found, Diamond would be a good option. In situations where adults are also being found, a knock down insecticide for adults will also be needed.

It can be difficult to obtain control of plant bugs once nymphs are embedded in a field. Be sure to obtain good coverage and potentially make more than one application if populations are high.

Deceptively Quiet: Between Emergence and First Bloom (*Bob Kemerait*): Traditionally, the lion's share of disease and management opportunities for cotton growers happen before the furrow is closed. Best management practices for seedling disease, Fusarium wilt, and management of plant-parasitic nematodes require that decisions are made at, or prior to, planting. More recently, growers have opportunity to manage target spot and areolate mildew with fungicide applications made at first-bloom and beyond. Often considered a "quiet time", the period between planting and first-bloom offers opportunity for additional management of diseases and nematodes.

1. **Application of Vydate CLV or Return XL for additional protection from nematodes.** When cotton is between the 5th and 7th true-leaf stage, these products (17 fl oz/A) can be applied to supplement (not replace) earlier use of in-furrow nematicides. Though results from UGA studies are variable, application of one of these products is the only option for growers once the furrow is closed.

2. **Management of potassium.** Stemphylium and Cercospora leaf spot diseases cause significant yield loss in many cotton fields across Georgia each year. As Dr. Glen Harris will tell you, the

secret behind management of these diseases is not additional use of fungicides (fungicides won't work for management of either disease) but by maintaining good soil fertility, especially with regards to potassium. Potassium deficiencies in a cotton plant make it much more susceptible to both diseases. Stemphylium and Cercospora leaf spots commonly occur in sandy areas of a field where potassium is more prone to leaching and where plant-parasitic nematodes are a problem. Damage from nematodes can affect uptake of potassium and other nutrients by the plant. These diseases are also more severe in non-irrigated fields during periods of drought as insufficient potassium is delivered to the plant.

3. **Scouting fields for early-detection of nematodes and Fusarium wilt**. While there is very little that can be done at this point in time (other than application of Vydate CLV or Return XL as noted above), growers still have the opportunity to identify areas of poor growth in their fields and to test for both nematodes and Fusarium wilt. Careful attention early in the season allows growers to make best-management decisions in future seasons.

Diseases and plant-parasitic nematodes cost growers each season in terms of lost yield and in cost of management. Care attention to the period after the furrow is closed and until first bloom can allow growers to better protect yield and profit now and in the future.

Is Nutsedge a Growing Concern in Your Cotton Field? (*Stanley Culpepper, Taylor Randell, Jenna Vance, Hannah Wright*): Historically, nutsedge is one of the most problematic weedy pests in all of agriculture. While often referred to as one species, yellow and purple nutsedge are actually two different species that are common in Georgia cotton exhibiting unique characteristics contributing to their ability to remain troublesome.

Yellow Nutsedge is a hardy, perennial sedge, tolerant of a range of moisture conditions as well as a wide soil pH range. It rapidly reproduces and spreads over large areas, due to a system of rhizomes and tubers. Rhizomes are an underground stem system that produces either a single nutsedge shoot (to emerge from underground) or a tuber at the tip of the rhizome. Additional rhizomes are formed from the tubers, and the cycle continues. A nutsedge plant can often reach reproductive maturity in 3-4 weeks in our environment, from

emergence to the production of another tuber. This allows for numerous flushes during each cropping season. Under optimum conditions, research has shown a single plant has the capability to produce more than 6,900 tubers, which can result in 1,900 new plants a year.

Purple Nutsedge, also a perennial sedge, is the more competitive of the two nutsedge species. It prefers well-drained soils and a warmer climate, where it produces an extensive underground stem system of rhizomes and tubers. The rhizomes either extend upward to form an aboveground shoot or down further into the soil where a tuber will form at its tip. These tubers will either produce shoots, or additional rhizomes and tubers, which will begin to grow together in a chain-like structure. Often in the 3-4 weeks following emergence, a purple nutsedge plant will have begun to form these reproductive structures in Georgia cotton. Compared to yellow nutsedge, purple nutsedge reproduces more aggressively.

Nutsedge control in cotton is complex but can be achieved through understanding the weed's biology, selecting and implementing timely management approaches, and making timely SEQUENTIAL herbicide applications THROUGHOUT the season. ***Due to yellow and purple nutsedge having a perennial life cycle and vast underground reproductive systems, control is best achieved when the tuber is targeted.***

Tillage, when used repeatedly and in a timely manner can be an effective approach, especially when used in conjunction with herbicides. Repeated tillage can break up the rhizome/tuber system, which prevents the carbohydrate storage needed for germination, therefore reducing population expansion. However, if not timely, tillage can actually spread the pest throughout the field.

Herbicides, similar to tillage, can be successful but only when implementing a timely systems approach. *The theory of making a single herbicide application and expecting adequate control of these nutsedge species is scientifically flawed.* Herbicides to consider for management in cotton include the following: glyphosate, Envoke, and MSMA. Reflex can be effective on yellow nutsedge (not purple), but current use rates in cotton are quite low for consistent control with this herbicide.

An example of a cotton weed management program designed for a field heavily infested with nutsedge:

Start Clean at Planting: Tillage or glyphosate at 2.25 lb ae (rate equal to 60 oz RU PowerMax 3 which is the max use rate) applied 8 days prior to planting, followed by Gramoxone applied 1 day prior to planting (Reentry interval for Gramoxone is currently 24 hours).

At Plant: Always use two residual herbicides for pigweed, Reflex depending on rate and rainfall/irrigation may be helpful on yellow nutsedge.

POST 1: As soon as the cotton is fully emerged at about 7 days after planting (hopefully), spot spray glyphosate (rate equal RU PowerMax 3 at 30 oz/A) on nutsedge infested areas of the field.

POST 2: About 14-17 days after planting or 7 to 10 days after the first glyphosate application, apply the broadcast application designed for pigweed management making sure to include glyphosate (rate equal to Roundup PowerMax 3 at 30 oz/A).

POST 3: Envoke can be applied to cotton after the five-leaf stage through 60 days prior to harvest. The herbicide is expected to cause some cotton injury when applied topically, including stunting; thus, a sloppy directed application may be more acceptable for some growers. Mixtures with glyphosate are very effective on both nutsedge species.

Layby: MSMA mixtures are advised and can be very effective. Also, if Envoke was not applied earlier in the season, then a mixture such as Direx + MSMA + Envoke is outstanding; if grasses are present, one could apply glyphosate + Direx + Envoke as an alternative, although the MSMA mixture is preferred for nutsedge.

IMPORTANT NOTES:

1. **For those relying heavily on a dicamba or 2,4-D system, which usually includes not running a layby or hooded sprayer, then science suggests you should be prepared for nutsedge to spread at an increasingly alarming rate……just like spiderwort, grasses, and morningglory. Run the dang layby in these problematic fields!!!!!!!!**
2. **This program relies too heavily on glyphosate, thus one should rotate to a crop allowing alternative nutsedge herbicides to be used in the following year!**

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
Georgia Cotton Commission Annual Meeting and UGA Cotton Production Workshop – January 2023