

Articles in this month's issue include:

1. High Abandonment Acres for U.S. Cotton Projected Due to Drought (Yangxuan Liu)
2. Importance of End of Season Irrigation Termination and Disease Control in Cotton (Bob Kemerait, Wesley Porter, David Hall, Jason Mallard)
3. Weather and Climate outlook for September 2022 and Beyond (Pam Knox)
4. Late Season Management Considerations for Diseases and Nematodes (Bob Kemerait)
5. Terminating Insecticide Applications (Phillip Roberts)
6. Defoliate in a Timely Manner to Manage Silverleaf Whitefly Populations and Preserve Yield and Fiber Quality (Phillip Roberts, Camp Hand)
7. Defoliation Considerations for 2022 (Camp Hand)

High Abandonment Acres for U.S. Cotton Projected Due to Drought (*Yangxuan Liu*): Every year, the U.S. Department of Agriculture's (USDA) National Agricultural Statistics Service (NASS) releases its projected harvest acres for U.S. cotton starting in August. The report provides updated information about expected U.S. cotton production. In 2022, the U.S. planted 12.3 million acres of upland cotton, the highest in 3 years, which was mainly due to historically high cotton prices during the decision-making and planting window.

However, in 2022, the overall U.S. abandonment rate for upland cotton is estimated at 43.4%, which is the highest on record since 1953. The abandonment rate, which measures the percentage of unharvested acres compared to total planted acres, provides an estimate of the number of failed acres versus the number of acres that will be harvested. Severe drought conditions hit the largest cotton production regions in the Southwest (Texas, Oklahoma, and Kansas) and the West (California, Arizona, and New Mexico). The abandonment rate for Texas (Figure 1A) reached 69%. Texas planted 7.1 million acres of cotton in 2022 – by far the largest of any state – representing 57.6% of total U.S. planted acres (Figure 1B). By contrast, drought impacts were less severe in the Delta (Missouri, Arkansas, Louisiana, Mississippi, and Tennessee) and Southeast (Alabama, Georgia, Florida, South Carolina, North Carolina, and Virginia).

As a result of the drought conditions this year, upland cotton harvested acreage in the U.S. is projected at 7.0 million acres, which is the lowest amount of harvested acreage in over 150 years. The projected high abandonment rate in the U.S. reduced expected cotton production to 12.2 million bales, compared to the 10-year average of 16 million bales, according to USDA's Foreign Agricultural Service. If realized, it would also be the smallest U.S. crop since 2009. U.S. cotton demand (mill use plus exports) for the 2022 crop is forecast at 14.3 million bales, exceeding production. As a result, ending stocks in the U.S. are expected to decline to 1.8 million bales, the lowest on record since 1960. The low supply of U.S. cotton provides support for domestic cotton prices. For the 2022/2023 marketing year, upland cotton prices are forecast at 97 cents per pound. If realized, it would be the highest price on record since 1909.

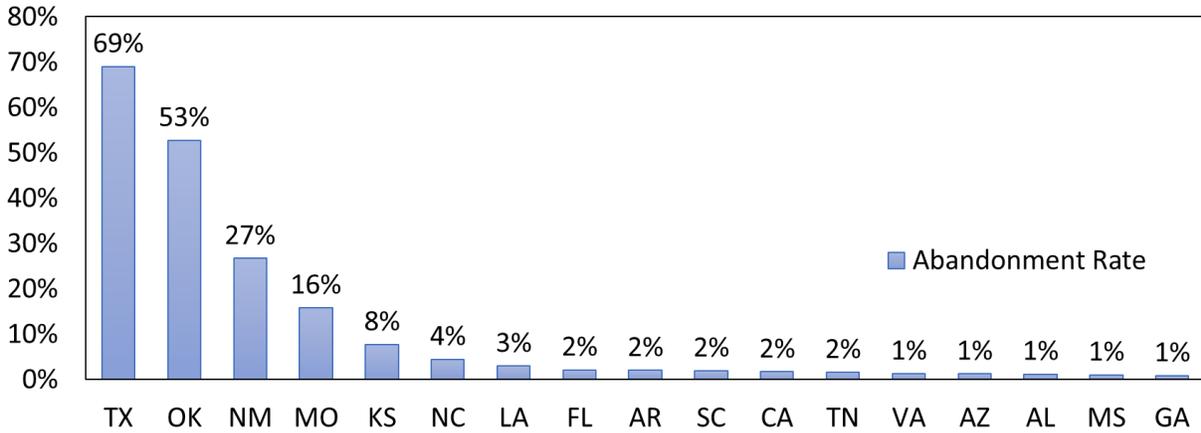


Figure 1A. Abandonment rate for cotton-producing states in the U.S. in 2022. Abandonment Rate = 1 – Harvested Acre/Planted Acre.

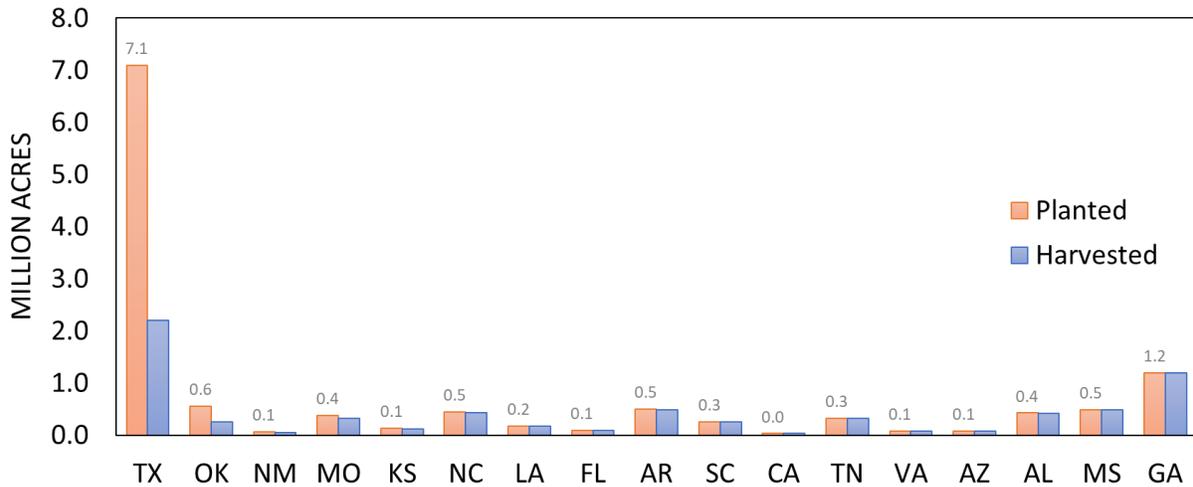


Figure 1B. Planted acres and projected harvest acres of cotton in 2022.

Importance of End of Season Irrigation Termination and Disease Control in Cotton (Bob Kemerait, Wesley Porter, David Hall, Jason Mallard): As we approach the end of the growing season we are around 16 to 20 weeks after planting moving through September and into October based on a May 1 planting date. On average, we will be around 14 to 18 weeks after planting throughout the month of September. This will put our water usage past peak and on the decline. UGA Extension cotton irrigation scheduling guidelines, like all other guides, must be used in conjunction with current field and atmospheric conditions. That means boots on the ground or moisture sensors to assist you in determining available moisture in the soil. September is historically dry with low humidity leading to soils drying out faster. We have been wet throughout most of July and August this year, causing high instances of disease issues. Growers should

keep in mind that the cotton plant moisture uptake is low, but there still is a need for some moisture in the soil to aid in finishing out those last harvestable bolls. At this point if the rainfall keeps up, there will be very little if no need for additional irrigation.

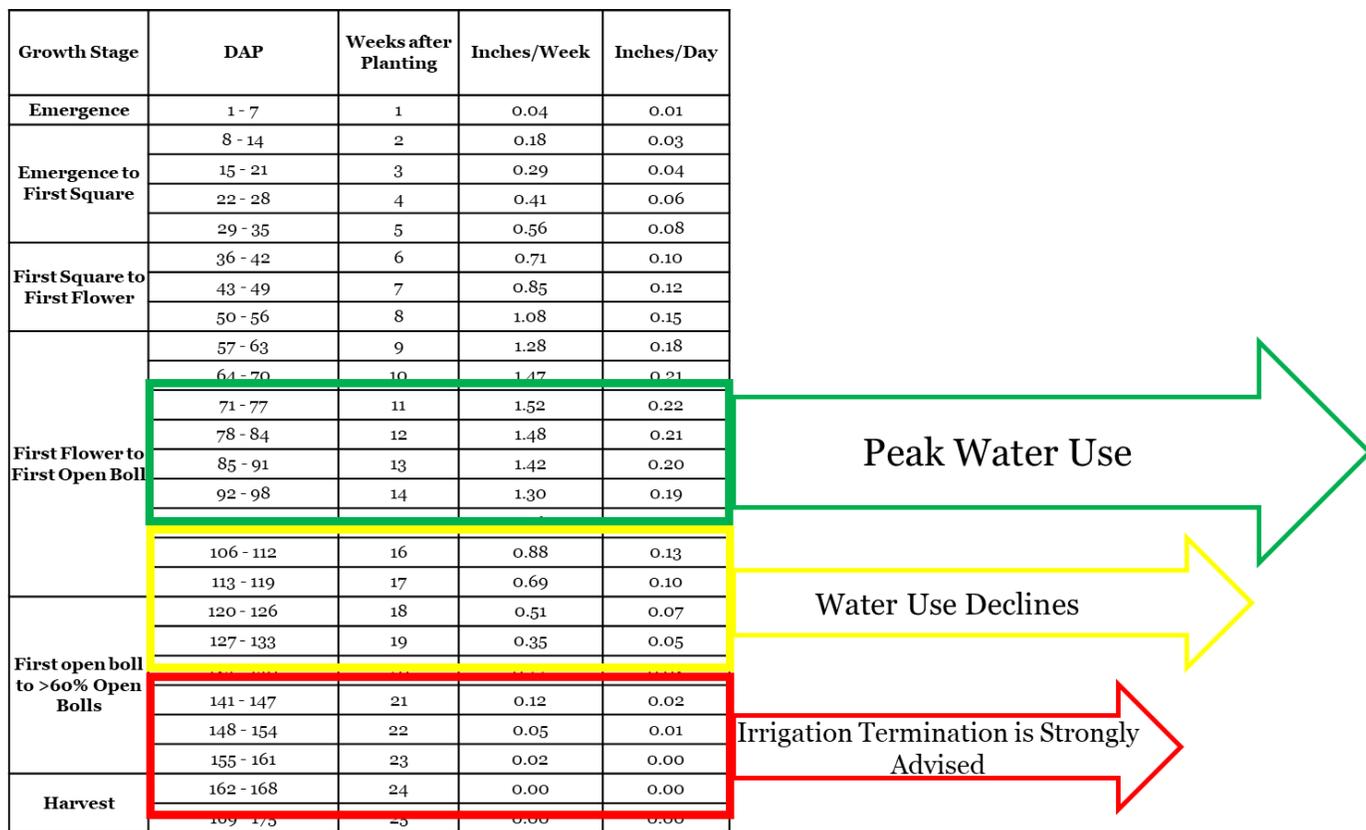


Figure 1. Seasonal cotton water usage with peak, decline and irrigation termination highlighted.

As water use declines, it is necessary to closely monitor your fields for cotton bolls that are beginning to open. UGA’s official irrigation termination recommendation for cotton is at an average of 10% open boll across a field. 10% open is not a high number of bolls on a plant that are open to start considering irrigation termination. A plant with 12 harvestable bolls means you need to be looking at the available soil moisture if 1.2 bolls are open. September 2019 was abnormally hot and dry. Bolls were beginning to open but our available water in the soil was depleted very rapidly due to the environmental conditions. Due to dry soils, hot temps and long-term dry weather forecasts, one last irrigation event(s) was(were) needed to help finish the crop. The low humidity and sunny conditions helped to prevent open bolls from being damaged. Currently, we are seeing high levels of moisture and boll rot similar to what we witnessed during 2020 because heavy dews, high humidity and plentiful rainfall are excellent conditions for it. Do not self-inflict or worsen boll rot issues if sufficient soil moisture is present. In times when an application of irrigation is needed, soak the soil sufficiently so that you can limit your irrigation events to as few as possible. Frequent small irrigation events will only exacerbate or flare boll rot. Paying attention to the long term and short-

term forecast is critical in your irrigation scheduling decisions as always. The tropics have a way of surprising us with pop up storms or even hurricanes this time of year.



Figure 2. Boll rot picture courtesy of Dr. Bob Kemerait

Mother Nature cannot be controlled but your irrigation applications can be. Two weeks from now we could be very dry, which would be very good for reducing new boll rot instances. The main point for irrigation termination on cotton is upon reaching that 10% open boll stage, do not over irrigate and increase boll rot, observe the current and long-term weather forecast, know your soil moisture content and use good judgement on terminating irrigation. Good moisture in the soil and 10% open bolls means the end of another irrigation cotton season!

An updated value by boll positioning chart was produced by Whitaker (2019) showing the importance of those lower and first position bolls.

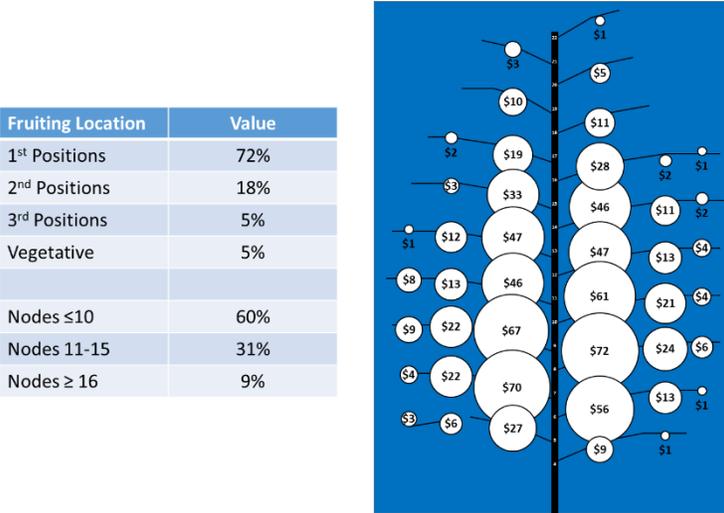


Figure 3. Boll position and value of boll position along the cotton plant, courtesy of Whitaker (2019).

This boll value tree really emphasizes the importance of first setting those high dollar bolls early in the season with proper management. Nearing the end of the growing season, overwatering and irrigating your crop with a higher than 10% open boll in an effort to make young upper position low value bolls open in the top will lead to losing or damaging your most valuable bolls and reducing yield and profitability. Not to mention, those young bolls probably will not mature enough to be harvested anyway. If you have questions about finalizing irrigation make sure you reach out to your local UGA County Extension Agent.

Weather and Climate Outlook for September 2022 and Beyond (*Pam Knox*): Most of the Southeast experienced conditions in August that were wetter and warmer than usual, although as usual there were variations across the region. Some areas are still feeling the impacts of too much rain, while others have experienced dry conditions that have reduced yields in their crops. The humid conditions and lack of sunshine in the areas that have experienced a lot of rain are feeling the impacts in the form of abundant fungal diseases and a difficult time for farmers to get into their fields.

September so far looks like it will be a continuation of warm and wet conditions, although there will be some more seasonal periods and some areas. There will be some periods of dry weather scattered amid the rainy days, so you will need to watch the weather forecasts carefully to find those windows of opportunity to work in the fields.

Later in fall, I expect to see drier conditions appear. This is not unusual in October, since this is the driest month of the year for many parts of the region, but it could be drier than usual as La Niña remains strong and continues to affect our weather over the fall and winter. Generally, La Niña has the strongest signal in southern Georgia and Alabama and into Florida, with more northern areas less predictable because the strength of the La Niña is more important in how it affects those regions.

The big question mark in all of this is the tropics. After a very quiet July and August (the quietest since 1941!), we are seeing some life in the tropics as we enter the peak of the Atlantic tropical season. The storms that are expected to form early in September are all predicted to turn north before they get close to the East Coast so won't provide much impact to us. However, there is still more than half the season to go, and some years, like 1961, had quite a few storms in the second half compared to the first half, so don't write off the season just yet. The eventual path and strength of the storms will determine what impacts we are likely to see, and of course we don't know where any storms that develop will go at this point. The best I can say is to keep watching the forecasts to make sure you know what is coming in time to make preparations well ahead of any rain or landfall that might occur.

Late Season Management Considerations for Diseases and Nematodes (*Bob Kemerait*): Though the 2022 season is not over yet, cotton bolls are beginning to turn fields across Georgia snowy white. It won't be long until pickers are back in the field and modules, lint is scattered along the roadsides, and round-bales fill the gin yards. Diseases and nematodes continue to steal yield from you, as they do every season. This was and continues to be, in large part, due to the frequent rain events and wet weather throughout much of

the season, though I am more than a little surprised that target spot and, especially, areolate mildew have not been more severe in the wet second half of the 2022 season. Certainly, spread of fungal and bacterial diseases is favored by the rains we have encountered since July.

There are eight primary disease/nematode conditions affecting Georgia's cotton fields now, though each may not be present in every field. There is not much to be done about them now (unless you are more than a month away from defoliation in which case management of areolate mildew matters), but still growers should watch for them as harvest approached so as to make the best management decisions in 2023.

1. Stemphylium leaf spot is present in most, if not all, fields and is identified by small-to-moderate sized lesions, often encircled by a dark, purple ring, on leaves showing signs of nutrient (potassium) deficiency. Stemphylium only occurs in conjunction with a potassium deficiency in the plant and can lead to rapid defoliation and significant yield loss. Stemphylium leaf spot is a very important problem in the state and is likely overlooked as growers have either become too familiar with it or do not think that there is much that can be done. Stemphylium leaf spot typically occurs in the same areas of a field year after year- sandier areas, sometimes infested with nematodes. Grower should take special steps to manage soil fertility (and nematodes) to reduce losses to this disease. Fungicides are NOT effective in the management of Stemphylium leaf spot.
2. Target spot has been less problematic this season than I had expected, despite extended periods of wet weather. This may be because cotton growers in areas most affected by target spot and areolate mildew are now more likely to use preventative fungicide applications than they have in the past. Use of fungicides is not always profitable if the level of target spot is low because of hot and dry conditions. However, I believe most growers who protect their cotton crop with fungicides in a wetter season like this has been will see economic benefit in doing do.
3. Areolate mildew has been problematic again in the cotton production region of Georgia, though perhaps less widespread than in 2021. I am hoping that this disease does not become an every-year occurrence and problem for our cotton producers. However, all data from field trials demonstrates that where areolate mildew occurs early enough in the season, judicious use of fungicides increases yields by as much as 400 lb/lint per acre.
4. Bacterial blight became established in some fields very early in the season on varieties that we know to be "susceptible" to this disease. Statewide, bacterial blight has been a very minor issue in 2022, demonstrating that the development and spread of a disease can be difficult to predict. Growers are reminded to be careful in their selection of varieties for 2023 as resistant varieties are THE most important measure for managing this disease.

5. Fungal boll rots have been absolutely devastating in some fields in Georgia this season, especially in fields with excessive, rank growth. Growers are understandably frustrated at the losses, and even more frustrated at the fact there is little to be done to reduce the threat from boll rot. Fungicides are not an effective management tool for control of boll rot. We in UGA Extension continue to seek to develop improved recommendations for management of its complex of diseases.

6. Fusarium wilt is becoming an increasing problem in Georgia's cotton fields. I don't know if this is because the problem is spreading or simply because growers are paying greater attention to it. Nonetheless, at this point Fusarium wilt can ONLY be managed in our fields by managing the parasitic nematodes associated with it, often by treating the field with a nematicide.



7. Nematodes in general (root-knot, reniform, sting and lance) continue to be a significant problem in our cotton fields. Growers are encouraged to make time after harvest and before cold weather hits to take soil samples from areas of poor growth in order to determine if nematodes are indeed a problem. Growers can also look for the tell-tale "tiger striping" on leaves of affected plants that give good indication that nematodes are present. In addition to use of nematicides to protect cotton from nematodes in the 2023 crop, growers also can select cotton varieties that are resistant to the southern root-knot and the reniform nematodes.



8. Cotton leafroll dwarf virus continues to be present in fields across Georgia, though of minimal importance. With the exception of extreme symptoms found on some varieties, especially on varieties such as DG 3615 and DG 3799, this viral disease can be a challenge to confirm based upon visual observations only. I cannot explain why CLRDV is not more of a problem in our cotton, but I am glad that it is not.

Taking stock of these eight disease and nematode issues now may not add value to the 2022 crop, but it will help growers to make more effective management decisions for 2023.

Terminating Insecticide Applications (*Phillip Roberts*): The decision to terminate insect controls can be challenging in some fields but a few basic considerations will assist in that decision. When evaluating a field a grower must first identify the last boll population which will significantly contribute to yield (bolls which you plan to harvest). In some situations the last population of bolls which you will harvest is easy to see (i.e. cotton which is loaded and cutout). In others, such as late planted cotton, the last population of bolls you will harvest will be determined by weather factors (the last bloom you expect to open and harvest based on heat unit accumulation). Once the last boll population is determined the boll development or approximate boll age should be estimated. Depending on the insect pest, bolls are relatively safe from attack at varying stages of boll development.

The table below list approximate boll age in days which bolls should be protected for selected insect pests. Cooler temperatures will slow plant development and subsequent boll age values may increase in such environments. It is assumed that the field is relatively insect pest free when the decision to terminate insecticide applications for a pest is made.

Insect Pest(s)	Approx. Boll Age (days)
Corn Earworm Tobacco Budworm	18-20 bolls fully sized
Stink Bugs	25
Fall Armyworm	bolls near maturity
Sucking Insects whiteflies aphids	harvest (honeydew accumulation on lint)

Defoliate in a Timely Manner to Manage Silverleaf Whitefly Populations and Preserve Yield and Fiber Quality (*Phillip Roberts, Camp Hand*): Silverleaf whitefly (SLWF) infestations have been common in some cotton producing areas. Historically, SLWF infestations are highest in areas which grow both cotton and vegetables. In these areas we grow crops 12 months out of the year which SLWF feeds and reproduces on. The primary cropping systems that drive overall SLWF populations in Georgia include:

1. Winter vegetables such as cabbage, collards, and kale.
2. Spring vegetables including cucurbits (cantaloupe, cucumbers, watermelons, and squash) and fruiting vegetables (tomato and egg plants), and others.

3. Agronomic crops such as cotton and soybean.
4. Fall vegetables which include a similar crop mix as spring vegetables.

Management of SLWF in these individual cropping systems affects infestations in subsequent crops as SLWF move from one cropping system to the next. Failing to properly manage SLWF in any one of these systems can have negative consequences for subsequent cropping systems. It is important that we properly manage SLWF in all cropping systems to manage the overall SLWF population. The SLWF population is somewhat like a snowball and just grows larger and larger during the summer. Have you ever considered how many SLWF are produced per acre if we defoliate 1, 2, or 3 weeks late? Timely defoliation will also lower the risk of having fiber quality problems related to whiteflies. Ultimately how we manage SLWF now will have impacts on us in 2023. By in large, Georgia growers have done a good job managing SLWF in cotton. Keeping in mind that SLWF requires management until harvest, one of the best practices is to defoliate in a timely manner. For more information on this subject see the following publication: *Cross-Commodity Management of Silverleaf Whitefly in Georgia* at the following website: https://secure.caes.uga.edu/extension/publications/files/pdf/C%201141_1.PDF

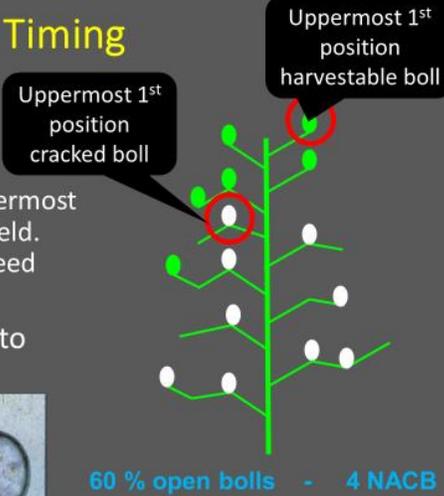
Defoliation Considerations for 2022 (*Camp Hand*): As we roll into September, it is time to start thinking about defoliating our cotton crop. As I have driven around the state in the month of August, I have already seen a number of fields ready to defoliate, particularly dryland fields in Southwest Georgia that were planted in late April/early May. I know that the weather in the past few weeks has put a damper on the crop as a whole, but it is time to start preparing for defoliation and harvest. Generally, I would say that the crop has been trending early, especially if you planted in May, so the best thing you could do is get out and look at your crop to make sure you defoliate at the right time. I've heard multiple growers this year say something along to the effect of they have never spent as much money on a cotton crop as they have in 2022. With that being said, my mindset is let's get this crop defoliated on time, harvested in a timely manner, and on the gin yard so our growers can get paid on this crop.

There are a few things I have been talking about as I venture around the state talking about defoliation, and some of the high points are below:

1. Make sure the defoliation “trigger” is pulled at the right time. There are many ways to determine the appropriate time to defoliate your cotton crop – 60 to 75% open boll, 4 nodes above cracked boll (NACB), and the “sharp knife” method. It's always good to use two methods to determine the correct timing as a way to double check yourself. To determine % open boll, count the number of open bolls, the number of unopened (harvestable) bolls, divide the number of open bolls by the total bolls and multiply by 100. For NACB, count the number of nodes from the uppermost first position cracked boll to the uppermost first position harvestable boll. When that number is 4, on average you are good to pull the trigger. And lastly, for the sharp knife method cut into the uppermost boll you intend to harvest and look for a black seed coat with developed cotyledons inside, and you want the lint to string out.

Defoliation Timing

- Three main methods:
 - 60 to 75% open boll
 - Nodes above cracked boll (NACB) ~4
 - Sharp knife method – cut into the uppermost boll that you expect to contribute to yield. Look for developed seed with brown seed coat and cotyledons.
- Important to use at least 2 methods to verify!!!

2. Make sure you are using the correct products and rates to accomplish your intended goals. There are 3 main goals in defoliation – leaf removal (juvenile and mature leaves), regrowth prevention, and boll opening. Determining which goals you are trying to accomplish, as well as the environmental conditions surrounding defoliation, will assist in the decision on products and rates. For regrowth control and juvenile leaf removal, thidiazuron containing products will be needed in the tank mix. Thidiazuron alone is available under many trade names (Dropp, Freefall, Klean-pik, etc.), and there is also a premix of thidiazuron + diuron (Ginstar, Cutout, Adios, etc.). Mature leaf removal can be accomplished with a number of products. The main one utilized in Georgia is Folex (tribufos), but there are a number of PPO inhibiting herbicides that can be utilized as well (Aim, ET, Sharpen, Reviton, Display, Blizzard, Resource). Lastly, your boll opening products contain ethephon. Whether it is ethephon alone (Boll Buster, SuperBoll, Setup, etc.), ethephon + urea sulfate (Cotton Quik, First Pick), or ethephon + cyclanalide (Finish), these will all open bolls.

The most common tank-mixture utilized by Georgia growers includes thidiazuron (Dropp), tribufos (Folex), and ethephon (Prep). Below is a table to assist in rate selection for each product from early to late season.

Common tank-mixes for GA Growers

“Three-way” Defoliation Mixtures
(Ethephon + Thidiazuron + Tribufos)

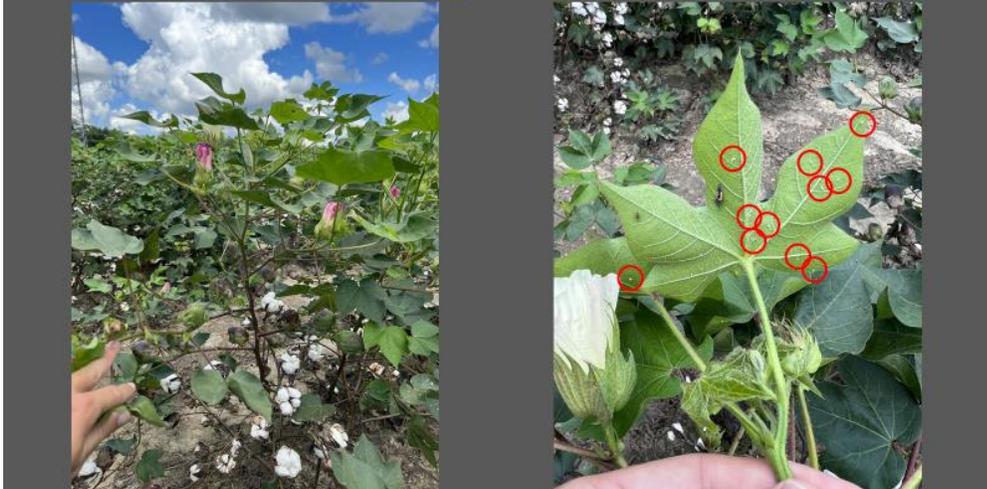
Season (Temperatures)	Ethephon (Prep)	Thidiazuron (Dropp)	Tribufos (Folex)
Early Season (highs >90, lows >70)	21 to 24 oz (1.33 to 1.5 pt)	1.5 to 3.0 oz	6 to 10 oz
Mid-Season (highs 80<89, lows 60<70)	24 to 32 oz (1.5 to 2.0 pt)	2.0 to 4.0 oz	8 to 12 oz
Late-Season (highs <80, lows <60)	32 - 42 oz (2.0 to 2.67 pt)	---	16 to 20 oz

Ethephon = rates increase with cooler temps, less effective, need more boll opening
 Thidiazuron = rates increase with cooler temps, less activity,
 increase rate with more regrowth, more green
 < activity when low is less than 65 F for 3 days
 Tribufos = increase rate with cooler temps, too high can desiccate, need more later

For ethephon and tribufos, as the season progresses and it gets cooler, rates should increase to get the desired effects. Whereas once we get to the end of the season, thidiazuron is removed from the tank-mix because as it gets cooler outside there is a lower risk of regrowth. Keep in mind that you can substitute tribufos for any of the aforementioned PPO inhibiting herbicides, and I would follow the same trends with rate selection (lower rates when it’s warmer outside, increase as it gets cooler). Recommended rates on each product discussed here throughout the season can be found beginning on page 148 of the 2022 UGA Cotton Production Guide, which is at the following link: <http://www.ugacotton.com/production-guide/>. Also, I will be in constant contact with our UGA County Extension agents throughout defoliation and harvest season, so if you have questions about products or rates feel free to reach out to your local UGA County Extension Agent.

3. Zero Tolerance for regrowth in 2022!!! Dr. Phillip Roberts has already discussed this in his newsletter entry, but keep in mind that one of the best things you could do to manage whiteflies in 2022 and assist in management for 2023 is defoliate your cotton crop in a timely manner. Below is a picture I took in some plots in Tifton. It is clear that the bottom crop is ready to defoliate, but with recent rains it has started regrowing and blooming. While many would try to “put a top” on this, we decided to defoliate it. Investing more money to try to make a top crop doesn’t seem worth it for a couple of reasons – first, we have enough money tied up in this crop as it is, and waiting on that top to finish will cause the bottom crop to deteriorate. Let’s get what’s there and call it a year. Second, if we let that regrowth keep going, that young growth is like cotton candy to whiteflies (circled in red below). They will keep feeding and reproducing there, and will contribute to the population going into the winter time and consequently into next year. Let’s defoliate this crop in a timely manner.

Zero Tolerance for Regrowth in 2022 - Whiteflies



4. One shot vs. two shot – what are the benefits? I get this question a good bit during defoliation time. In Georgia, we primarily use 1 shot for defoliation and it works very well. Rarely will I ever recommend a second shot unless something went wrong on the first. So keep in mind the amount of money already invested in this crop – a second shot at defoliation means more chemical costs, as well as diesel fuel/application costs. Let’s get it done right the first time and get the crop out in a timely manner.
5. Mo’ water is mo’ better. A higher sprayer output (gallons per acre) works better than a lower sprayer output with respect to defoliation (even if you decide to use dicamba nozzles). Let’s shoot for 15 GPA if you’re defoliating with a ground rig to get defoliant down in the canopy.
6. **KEEP DEFOLIANTS ON TARGET!!!!** I talked about this a lot last year. It is imperative that we apply all pesticides responsibly, let’s not forget that at the finish line. Keep the lessons from Using Pesticides Wisely trainings at the forefront of your mind as we apply all pesticides, including defoliants. Keep in mind what is around your fields, the wind speed and direction at the time of and after application, keep the spray booms 24” above the crop canopy, and use nozzles that produce larger droplets with a higher spray output. It is important from the aspect of reducing pesticide drift in general, but also from the standpoint of protecting the chemistries we use. You have likely heard myself and other specialists discuss the petition submitted to the EPA to revoke all tolerances and cancel registrations for all organophosphate pesticides. On the lists of pesticides included in the petition are a lot of important ones – acephate (Orthene), dicrotophos (Bidrin), phorate (Thimet), malathion, and many others. But one of the most common defoliants in used in the cotton belt, tribufos (Folex), is also on that list. It is of vital importance that we apply Folex and these other pesticides responsibly so that we will have them in the future. If you would like to submit a comment to the EPA stating how important these chemistries are to you and your

operation, please contact your local UGA County Extension Agent. They all know how to do this, and I promise that the EPA reads these comments and values input from producers.

7. Timely defoliation and harvest are key to producing a high-quality crop. Only defoliate what you can come back and harvest in about 10 to 14 days. This helps preserve crop quality and can reduce the likelihood of an extraneous matter call. And speaking of extraneous matter, handle your modules carefully and be sure to get grocery bags/balloons out of your field prior to harvest to reduce the likelihood of plastic contamination. It's a 2X deduction from the classing office and our friends at the gin don't like plastic. Let's do our part to reduce plastic contamination.

I hope that everyone has a safe and prosperous defoliation and harvest season. As always, if you ever have questions or need anything please don't hesitate to reach out to your local UGA County Extension Agent. They, along with us specialists, are here to help!

Important Dates:

J Phil Campbell Cotton Field Day – Watkinsville, GA – September 28, 2022

Georgia Cotton Commission Annual Meeting and UGA Cotton Production Workshop – January 25, 2023