UNIVERSITY OF GEORGIA EXTENSION

UGA Cotton Team Newsletter
August 2021

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2. How to Fertilize Drowned Out Cotton (*Glen Harris*)
3. Cotton Irrigation Considerations for August (*Wes Porter and David Hall*)
4. Cotton response to excessive rain, cloudy days, and management strategies (*Camp Hand and John Snider*)
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8. Stinkbug Management (*Phillip Roberts*)

Managing Target Spot and Areolate Mildew (*Bob Kemerait*): Target spot (*Corynespora cassiicola*) and areolate mildew (*Ramulariopsis gossyppii*) are the two most important diseases affecting cotton in Georgia later in the growing season. For both target spot and areolate mildew, judicious use of fungicides not only protects the crop, but can increase yield profitability as well. Another disease, Stemphylium leaf spot, is often even more common than either target spot or areolae mildew in Georgia's cotton crop. However, as Stemphylium leaf spot results from a deficiency of potassium within the plant, to date use fungicides has not proven to be an effective management strategy.

As of this date (1 August 2021), target spot has been found widely found in cotton growing in southern Georgia. Abundant rain, high humidity, and rank growth of some cotton all contribute to the increased importance of target spot this season. Areolate mildew has not yet been confirmed in the state, but it is only a matter of time before it is found.

Presented below is a slide of the fungicides currently labeled for management of target spot and results from recent on-farm trials conducted in Colquitt County with UGA Extension agent Jeremy Kichler. The two fungicides that have performed "best" against target spot have been Priaxor and Miravis Top, close behind this pair has been Headline. Unfortunately, if seems that none of these fungicides are readily available this season to cotton growers in Georgia. This leaves azoxystrobin (sold under various trade names). Azoxystrobin is a fair-to-good fungicide for control of target spot; it is a good-to-very-good fungicide for control of areolate mildew. Amistar Top, a combination of azoxystrobin and difenconazole, is another fungicide that could be considered when Priaxor, Miravis Top, and Headline are in short supply. The use rate for Amistar Top is 8-11.6 fl oz/A.

Growers should consider protecting their cotton crop from target spot between the 1st and 6th weeks of bloom IF the disease is present, or is likely to develop, and conditions are favorable for development and spread, and IF the crop has good yield potential. (As from earlier, conditions for development and spread of target spot are EXCELLENT in 2021.) Judicious use of fungicides can protect as much as 250 lb of lint

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where target spot is problematic. Where the crop is suffering from drought or poor growth from other causes, protection against target spot with a fungicide may not be warranted.

Recent image from Colquitt County of target spot where Jeremy Kichler reports that defoliation is already 40% in one cotton field crop is in the 4th week of bloom.

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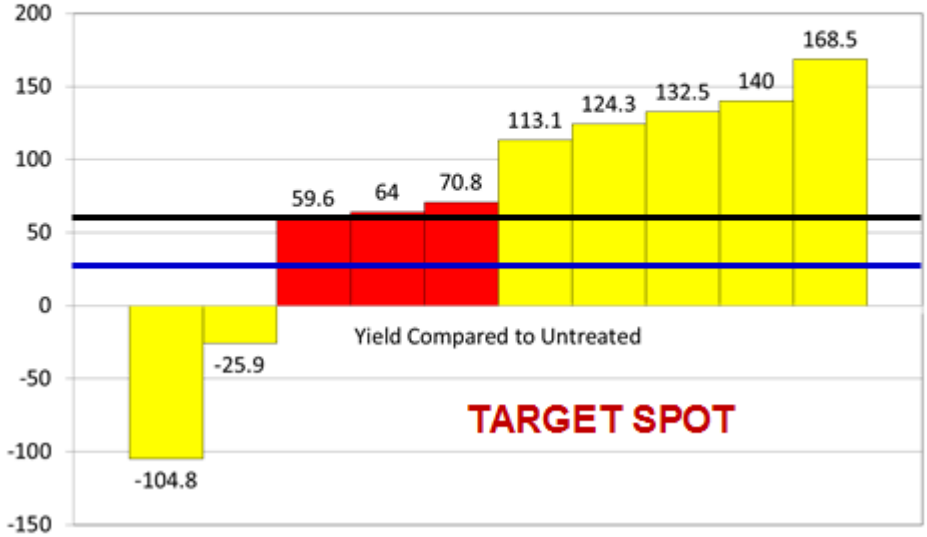
Fungicides for Foliar Diseases of Cotton

- Headline (pyraclostrobin) (6 fl oz/A)
- Twinline (pyraclostrobin + metconazole) (7-8.5 fl oz
- Quadris (azoxystrobin) (6 or 9 fl oz/A)
- AzoxyStar (azoxystrobin)) (6 or 9 fl oz/A)
- Tebuzol 3.6F (tebuconazol) (6-8 fl oz/A)
  - Labeled for control of southwestern cotton rust
  - *Puccinia cacabata*
- PROLINE (prothioconazole)) (5.0-5.7 fl oz/A)
- PRIAXOR (4.0-6.0 fl oz/A)
- MIRAVIS TOP (13.6 fl oz)
- Elatus
- TOPGUARD (flutriafol)

2016-2018 Lint Yield vs Untreated

ORANGE: 1 application Priaxor ($18, @ $0.62 cotton need 29 lb lint

YELLOW: 2 applications Priaxor ($36, @ $0.62 cotton need 58 lb lint



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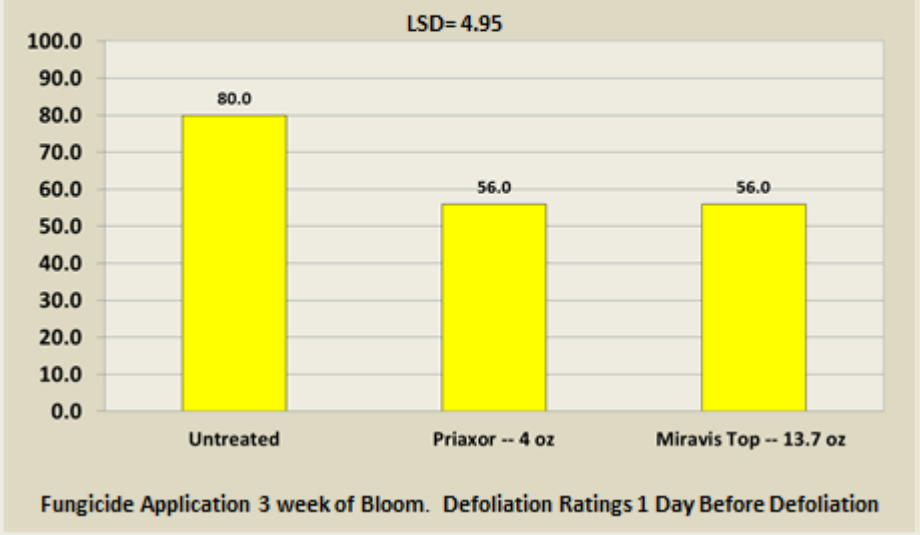
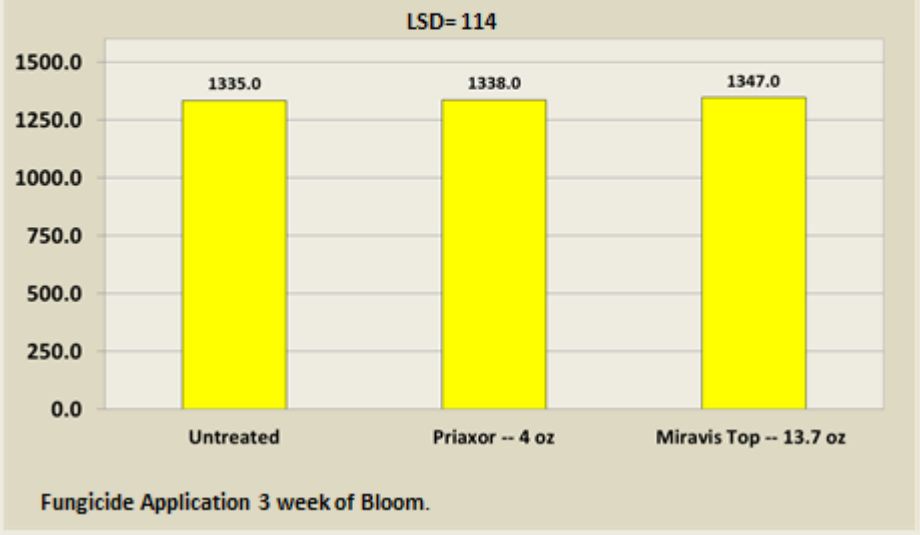
2019 Colquitt County Cotton Fungicide Plot
Doerun, Georgia
% Canopy Defoliation



Fungicide Application 3 week of Bloom. Defoliation Ratings 1 Day Before Defoliation

2019 Colquitt County Cotton Fungicide Plot
Doerun, Georgia
Lint Yield (Lbs/A)



Fungicide Application 3 week of Bloom.

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Areolate mildew will be a problem for Georgia's cotton in 2021. Prior to 2017, this disease was usually restricted to the southeastern part of our cotton production region and often occurred so late in the season as to be inconsequential. However, since 2017 areolate mildew has been found over a wider area of Georgia's cotton production and also earlier in the season. Areolate mildew that occurs within four weeks of when a grower intends to defoliate a cotton crop will likely have minimal effect on yield. Areolate mildew occurring earlier can affect yield and profit.

Areolate mildew is easier to control than is target spot, because the disease is more exposed on the upper foliage of the cotton plant than is target spot, which develops deep in the canopy. The same fungicides that protect the cotton crop against target spot also protect against areolate mildew. However, while azoxystrobin is less effective against target spot than are Priaxor or Miravis Top, azoxystrobin has been effective against areolate mildew. **Growers are CAUTIONED that azoxystrobin is a single-site mode of action fungicide and that multiple applications of this fungicide alone in a season will hasten development of fungicide resistance.**

Presented below are images of areolate mildew as well as results from field trials in Colquitt County (Jeremy Kichler).

Areolate Mildew

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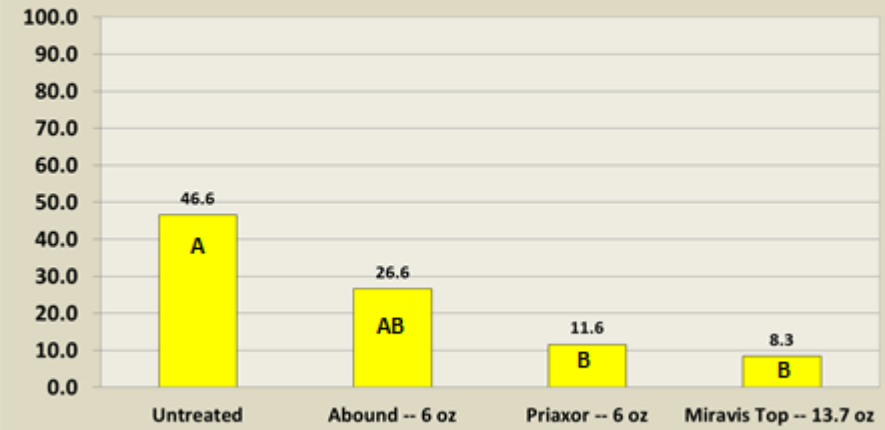
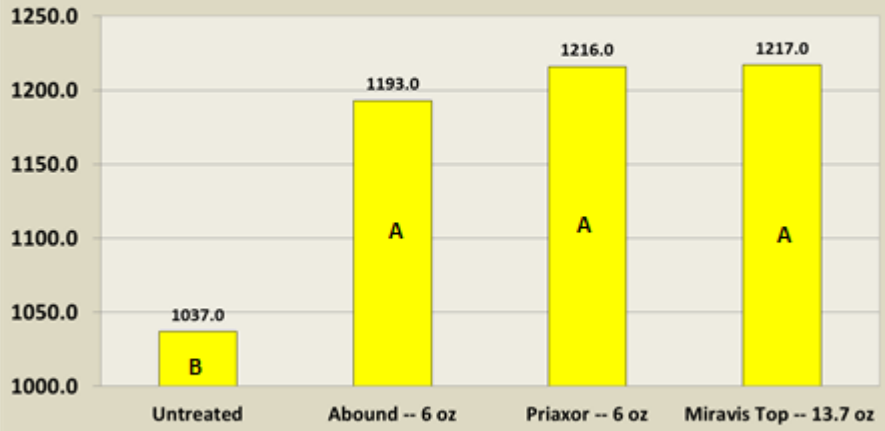
2020 Colquitt County Cotton Fungicide Plot
Areolate Mildew Bay, Georgia
Percent Defoliation



Defoliation Ratings at 60-70% open boll

2020 Colquitt County Cotton Fungicide Plot
Areolate Mildew, Bay, Georgia
Lint Yield (Lbs/A)



Fungicide Application 3rd week of Bloom.

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How to Fertilize Drowned Out Cotton (*Glen Harris*): Obviously, it has been a wet growing season in South Georgia. It reminds me of 2013 when it rained every day in June. Up until then I really didn't think you could drown a South Georgia sand. But when all the pore space in even our sandy soils gets filled with water we reach saturation or 'waterlogging". This may cause the cotton plant to shut down or not function properly to the point where it doesn't take nutrients up from the soil very well if at all. Since nitrogen is the fertilizer nutrient needed in largest amounts by plant, the nitrogen deficiency symptoms or "yellowing" of the leaves shows through the most.

Some areas of the cotton belt in Georgia have received more rain than others. Also, It appears that early planted (May) cotton is looking better than late planted (June) cotton. I've heard a lot of people say " I leached out or lost all my fertilizer". I've also heard growers say it's been so wet I have not been able to sidedress my cotton". "Should I replace some N and K on the ground? Should I switch to foliar? What should I do?

Normally we (UGA) would recommend applying ¼ to 1/3 of your total N rate and all of your K to the soil at planting, followed by sidedressing N between first square and first bloom. Normally…we (UGA) would recommend switching over to foliar feeding N and K after the 3rd week of bloom, or in other words no more N or K soil applied after this point. But this is not a normal year (is there such a thing anymore?).

So let's look at a few common scenarios: 1) May planted cotton and you were able to get your sidedress nitrogen applied. Cotton has been blooming for at least 3 weeks, now you've had a bunch of rain and the crop looks yellow. Should you apply more N and K to the soil (if it gets dry enough to get a fertilizer truck or buggy in the field)? Probably not. For three reasons. One, the N and K may not be all leached out. Only the nitrate form of N is leachable and K is not as mobile as N. Two, the waterlogging is hopefully temporary and as soon as the soil dries out some the plant can take up N and K again. And three, since the cotton has been blooming for at least three weeks, the roots are not as efficient at taking up nutrients, plus they may have been damaged or compromised by the wet weather (and maybe some nematodes too). Basically, even if you apply more N and K to the soil the plant will have a difficult time taking them up. So the recommendation is? Foliar feed with N and K.

Scenario number 2: June planted cotton just starting to bloom and has not been sidressed with N. Looks N and K deficient. Since the cotton has just started blooming there is still time to soil apply N. The recommendation would be to apply 30-50 lb N/a to the soil. I would not soil apply K at this late point. And even after soil applying N, be prepared to foliar feed with N and K after the third week of bloom.

Scenario 3: June planted cotton that has been blooming for 3 weeks and no sidedress N applied. This is a tricky one. Again, normally we would switch to foliar feeding at this point. However, it would be difficult to apply enough nitrogen foliar. Therefore, I would still apply 30-50 lb N/a to soil on this cotton. As in scenario number 2, time is an issue, with only 4-6 weeks of potential boll setting time left you don't want to go with too high of rate in either of these situations.

So a few things to keep in mind:

1) Not all of your soil applied N and K may have leached out

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2) Swithc to foliar N and K after 3rd week of bloom (unless no sidedress N has been applied)
3) Petiole and tissue sampling are a good way to confirm if you are N or K deficient.

Cotton Irrigation Considerations for August (*Wes Porter and David Hall*): Up to the end of July we have had an extremely wet past month. Across most of the southern portion of the state it has rained near every day. Rainfall amounts range from a few tenths up to a few inches depending on area. Overall, we have not required much irrigation on cotton, and have actually kept a lot of our later planted crop in saturated conditions during most of the early season. The crop that was planted during May should be reaching peak water use now. It should be in peak bloom, sometime around 2-6 weeks of bloom. If you are in peak bloom and were able to get into the field early enough and get it fertilized, the smaller rain events can be very helpful. As long as we have not gotten an extremely high rainfall event, we've basically been meeting (and maybe even exceeding) the crop water requirement. One of the hardest decisions to make during a "wet" year or season is when to irrigate and when not to irrigate. Data have consistently shown that over-irrigating cotton causes yield reductions. Thus, be cautious when deciding to turn the irrigation system on this year. A good soil water balance model or soil moisture sensors can really aid in building confidence on when to apply those few small events to prevent yield loss, and when not to apply those events for the same reason. As mentioned in last month's newsletter, we have been ramping up water demand to this year's peak demand in cotton. Even though perhaps peak water demand may be past if the crop was planted during late April or early May, we cannot get behind on irrigation during bloom. As mentioned above, we are in peak water usage, thus, it is critical that we continue to monitor the weather and make smart irrigation decisions.

Even though it has been wet since mid-June, don't get too comfortable. Over the next month, keeping up with the water requirements is very important. The water demand will be lowering as we move on into the season, but it is still critical to have adequate soil moisture during the entire period of bloom. Based on planting date, the weekly water requirement of the crop can range between about 1.0 to 1.5 inches per week based on the UGA Extension checkbook method for cotton. Please keep in mind the weather conditions and how much of an impact they can have on water requirements. In other words, the checkbook method is there to give you a reference to go on, but should not be used for the final decision. We are entering the tropical storm season and have opportunities for large rain events and even some hit or miss showers as we have already seen through late June and into July. Some days can be of intense heat with low humidity, leading to high evapotranspiration rates and cause the need for more water than recommended for that week. Conversely, we can receive hot days with very high humidity and overcast conditions which will mean the plant is still using water but the evapotranspiration rate is very low. Plus, with a good canopy closure the ground is shaded well. It's really amazing to see crop water use through moisture sensors. The graphical representations of plant water demand and environmental conditions can be an eye-opening experience to witness throughout a growing season. If you don't have access to moisture sensors, walking your fields with a shovel or soil probe to investigate available moisture is highly recommended. Again, the checkbook method is just one tool of many tools that can be used to assist in scheduling irrigation.

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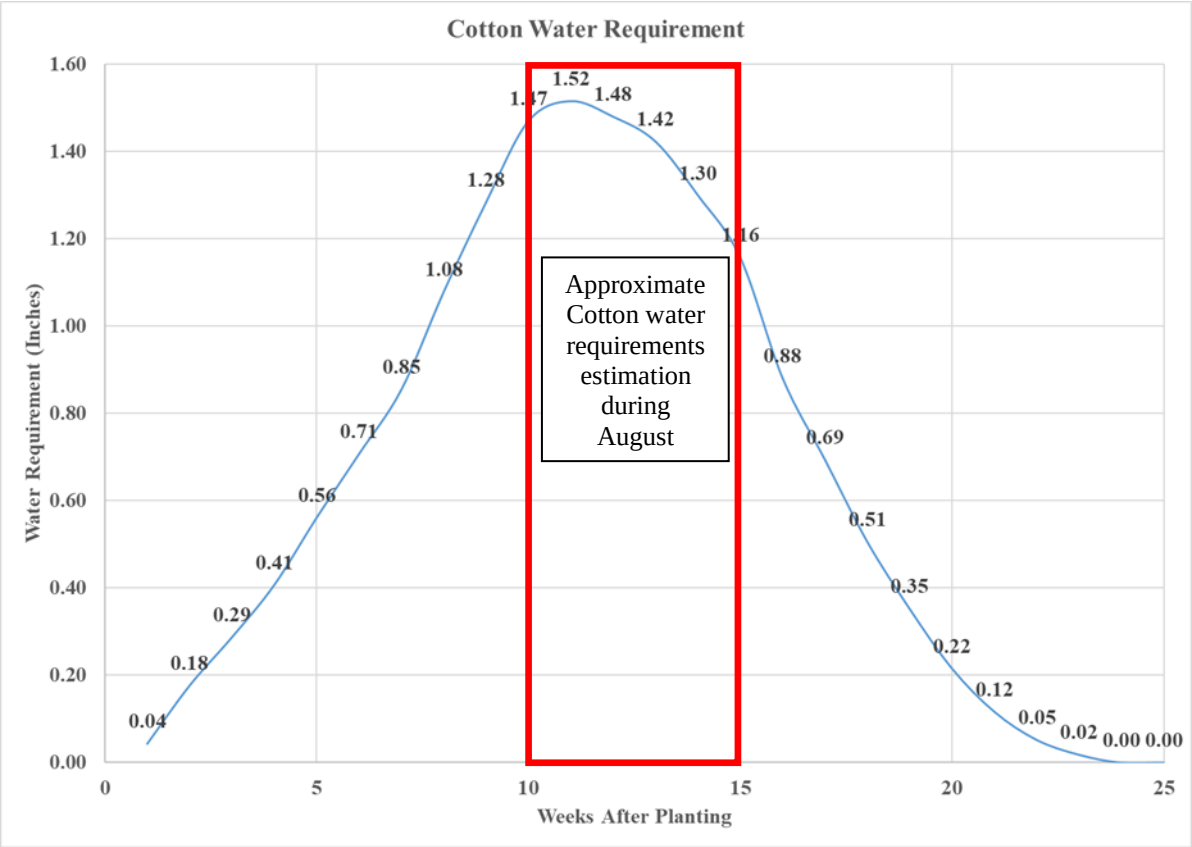

Figure 1. UGA Cotton Checkbook, with the estimated water use period highlighted.

Additionally, with the high amounts of rainfall over the past month it has been very difficult to get sprayers into the fields, thus, many growers may be considering chemigation. Chemigation through pivots may not be for everyone but with possible disease and insect pressure and many acres to cover, this practice may prove timesaving and effective. Remember, read the label to ensure the pesticide is approved for chemigation. Also, run the pivot at 100 percent to apply the least amount of water while chemigating. If your system can not apply 0.1 of an inch or less per revolution, chemigation is out of the question. Remember the goal of chemigation is to apply chemical to the foliage of the plant, not the soil. This also means that a chemigation event cannot accurately and validly be counted as an irrigation application. It is also very important to know that your pivot is apply uniformly before considering injecting anything through it for application. So, if you have not had a recent uniformity test performed on the system we strongly discourage the usage of chemigation or fertigation.

If you are considering fertigation using the pivot, that is perfectly fine. However, keep in mind that the goal in fertigation is to get the fertilizer to the soil and into the top few inches of the soil. Ensure that you are applying the water at a rate to accomplish this, not to leave water and fertilizer on the crop canopy, and not to cause runoff or leaching of the nutrients. There are a variety of "foliar fertilizer" products available. If you are applying a very small amount of a fertilizer product, perhaps a ground rig or airplane may be a better option to get the product into the foliage. Please talk with your County Agent when contemplating

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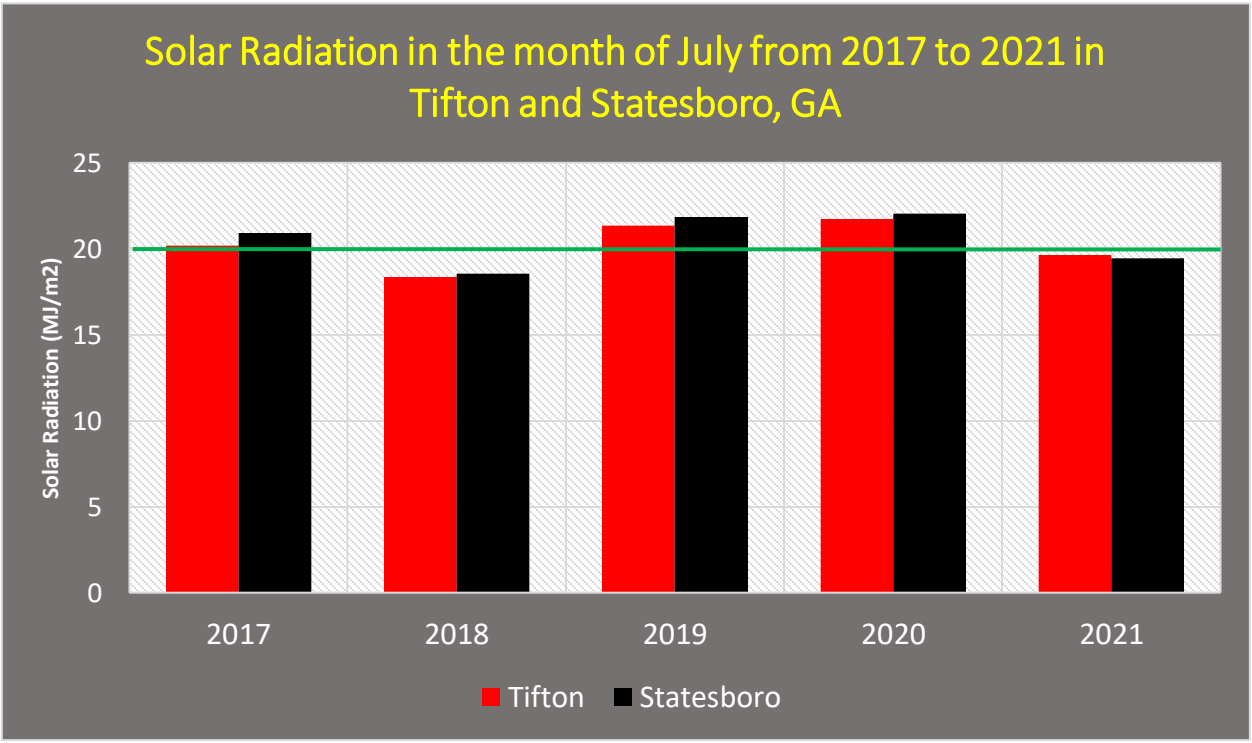
foliar applied fertilizer. Proper and timely tissue and petiole sampling can identify a certain nutrient deficiency before potential yield loss is created. An Agent can provide vital data and information from Dr. Glen Harris on what products have been tested, proven to be effective and whether they can be of benefit due to the stage of the crop.

If you have further questions about irrigation requirements, chemigation or fertigation reach out to your local UGA County Extension Agent.

Cotton response to excessive rain, cloudy days, and management strategies (*Camp Hand and John Snider*): As many people across the state of Georgia are aware, July has been a rainy month with many cloudy days. This can have can affect fruiting and fruit retention in cotton. The graph below shows the average solar radiation for the month of July for the past five years in Tifton and Statesboro. This data is courtesy of the UGA Weather Monitoring Network (www.georgiaweather.net).



In this graph, the green line represents the 5 year average for both locations. In the past five years only twice has solar radiation fallen below average: 2018 and 2021. Many people will remember that 2018 was similar to what we have been seeing lately: extensive overcast skies, pop-up showers, and excessive rainfall throughout the season. Although I do not think the full extent of those events were realized at the end of the year in 2018, we might be facing a similar situation this year.

Cloudy days can result in fruit shed in cotton. This is mainly because low light conditions reduce carbohydrate availability during fruit development, and the plant makes a calculated "decision" early on that it will not be able to

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support the developing boll. In addition to this, the excessive rainfall for the month of July has led to many waterlogged plants. This can result in reduced root development, thus reducing nutrient uptake and stunting growth. This can also contribute to fruit shed.

With this being said, what can be done? I know that many people are trying to be aggressive in their PGR regimes, as many aggressive varieties are grown in Georgia with high fertility and high yield goals pursued. However, at this point in the game, we must be vigilant. We are approaching the point in the year where time is of the essence, and every second becomes valuable. PGR applications should not be made when our crop is stressed, and although many people say this specifically pertains to drought stress, the concept applies to waterlogged cotton as well. Additionally, fruit retention should be monitored. If fruit retention is low, consider being less aggressive with PGRs. For the plant to compensate for low light-induced fruit shed, the plant must be allowed to grow to have the opportunity to produce additional fruiting sites if necessary. What is generally considered normal for Georgia cotton production is 8 to 10 first position bolls, with roughly 60% boll retention.

In addition to the impacts on fruit retention, this weather has kept many people out of the field. With that, some questions have arisen about utilizing higher rates of PGRs in an attempt to "catch up" or out of an abundance of caution. Some are concerned that more showers may come through and prevent them from getting back in the field again. I would like to remind everyone that the maximum labeled rate of mepiquat chloride (0.35 lb/gal product) is 24 oz/acre. Below are pictures of DG 3799 B3XF that was treated with 0 oz/acre (left), 16 oz/acre (center), and 24 oz/acre (right) at first bloom, which was approximately July 9.

0 oz/acre

16 oz/acre

24 oz/acre

At this point, the 16 and 24 oz treatments do not look too different in terms of height. However, the 24 oz treatment will likely keep the plant shorter for a little bit longer due to the higher concentration in the plant. Before making an application of 24 oz/acre, keep in mind the thoughts earlier on environmental conditions.

Although we can't control mother nature, we can try to make the most of what she throws at us. Your local UGA county extension agents, along with myself and the other specialists, are here to help. Please do not hesitate to reach out with any questions!

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Causes of fruit shed (*John Snider, Camp Hand, Gurpreet Virk*): In recent weeks, I've received a number of questions about how weather conditions could potentially affect fruit retention in cotton. Another brief writeup in this newsletter addresses current weather conditions and discusses some management considerations for our excessively wet, cloudy year. However, I'd like to also take this opportunity to revisit a newsletter item I wrote last year that addresses physiological aspects of fruit shed in cotton, with some minor updates specific to our current growing season.

Squaring, flowering, and boll development: To understand the causes of square and boll shed it is first important to have a basic understanding of flower and fruit development. The first reproductive structures that are visible on the plant are floral buds called squares. Squaring happens about five weeks after planting, once 425-475 DD60s have accumulated after emergence. The square can be classified into different developmental stages based on the shape and size of the bud. For example, a pinhead square will have a floral bud roughly the size of a pinhead once the bracts are removed to make the floral bud visible; a match-head square will have a floral bud roughly the size of a match-head. Figure 1 from Ritchie et al. (2007) provides an overview of the different stages of floral development from pinhead square to flowering.

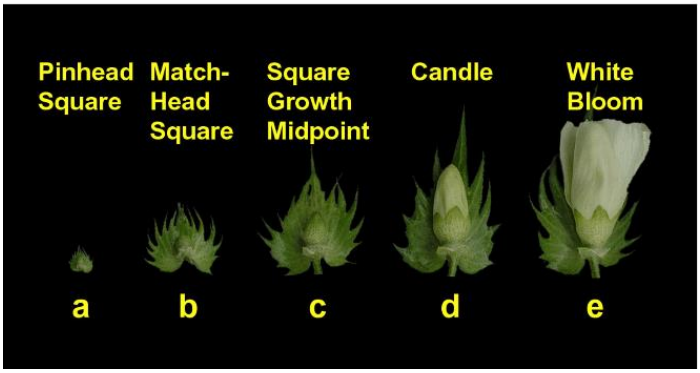

Figure 1: Different developmental stages of floral development (from Ritchie et al., 2007).

The first open cotton flower (white in color) is observed about 3 weeks after the first square is visible. The flower opens and pollination occurs in the morning on the day of anthesis, but the timing of these events depends on relative humidity and temperature. Fertilization of the ovules inside the ovary of the flower is essential for seed and boll development. This occurs between 12 and 24 h after pollination. The white flower will transition from a white to a pink/red color as floral structures other than the ovary (developing boll) begin to die. The pink flower usually dries out and falls off approximately 5 to 7 days after flowering, which exposes the developing boll.

In the first three weeks of boll development, the capsule wall will reach its final size and dry weight, the fiber will reach its final length, and the embryo inside the developing seed will reach its final volume. However, the majority of the boll's final dry weight will be accumulated after this point as seed filling and fiber thickening continue to occur until ~38 days after flowering.

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The shedding process: The process and causes of fruit shed in cotton were detailed decades ago by Guinn (1982). Shedding (abscission) of squares or bolls can be observed in any cotton field, and can be influenced by a number of factors. Leaves and fruit contain a layer of cells at the base of the petiole (leaves) or peduncle (fruit stalk) called the abscission zone. Abscission takes place due to softening and weakening of the cells in this zone because of two main digestive enzymes: pectinase and cellulase. High levels of the naturally occurring plant hormone IAA in a square or boll will inhibit the production of these enzymes. A decline in IAA or a decrease in the ratio of IAA to ABA in the fruit will stimulate ethylene production, which increases the production of these degradative enzymes and promotes the abscission process. Factors driving square and fruit shed will be discussed next.

Age and position on the plant: Insect injury to developing squares and bolls has long been known to cause abscission at a wide range of developmental stages because injury stimulates ethylene production which promotes shedding. However, a certain amount of shedding occurs naturally in the absence of biotic stresses. Under normal conditions, the cotton plant will naturally shed nearly 60% of all squares it produces. Young squares are far more likely to shed than squares at or beyond the mid-point. Open flowers typically will not shed in the absence of direct injury. Bolls are most likely to shed during the early stages of development (5 to 7 days after flowering). Once the cotton boll has made it beyond two weeks after flowering, it is unlikely to shed. This makes a lot of sense from an energetic perspective. Early during development, the plant hasn't invested much in the developing boll. As the boll continues to develop, it accumulates more dry matter and it would be energetically costly to lose the boll past a certain stage (two weeks in this instance).

Along with fruit age, crop development and position on the plant affect fruit abscission. Since young bolls are the most likely to shed, the highest rates of shedding are commonly observed one week following peak bloom (give or take a few days). So, if a grower has large cotton plants with a high number of fruiting sites, one can expect to start seeing plenty of young bolls on the ground during this period. This is not automatically cause for concern.

The position of a square or boll on the plant also influences abscission rate. As a general rule, squares produced at fruiting branch positions farther away from the main stem have a lower probability of being retained than those closer to the main stem. Specifically, first position squares have a 74% percent probability of being retained until boll maturity. Probability of retention decreases to 24% for the second position, and 2% for the third position (averaged across all nodes). This is likely because bolls closer to the mainstem get a larger portion of the carbohydrates produced by mainstem leaves and because subtending leaves tend to be larger for first position fruit than for second and third position fruit.

Environmental factors: Square and boll shedding can be influenced by light intensity, temperature and water. It has long been recognized that cloudy weather negatively impacts fruit retention, and some of the earliest research on fruit abscission addressed the impact of low light on the shedding process. Figure 2 summarizes the effect of fruit age and shading on shedding in cotton and is derived from Guinn et al. (1982). It shows that low light intensity (for potted plants in a poorly lit room) for three consecutive days caused nearly 100% fruit shed if the low light conditions were initiated during the first week after flowering. Sensitivity to low light declines substantially with increases in fruit age; short term low-light conditions

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had no effect on fruit retention for > 2 week-old bolls. Subsequent work using shade structures under field conditions showed a 20 percent reduction in lint yield due to declines in boll number when light intensity was reduced just 30 percent, relative to natural conditions (Pettigrew, 1994).

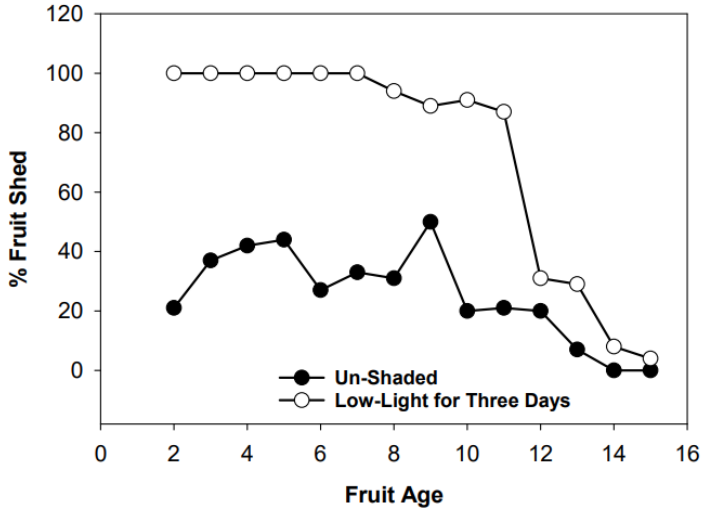

Figure 2: The effect of low light intensity and fruit age on fruit shed (Guinn et al., 1982).

High temperatures more negatively impact reproductive development than vegetative development. For example, work by Hodges et al. (1993) showed that day/night temperatures in excess of 95/81°F (day/night temperature) positively impacted overall plant growth and fruiting site production, but substantially increased boll abscission, negatively impacting productivity. This can be explained by the fact that a certain percentage of the ovules in a developing boll must be fertilized for the boll to be retained. Heat stress that occurs during pollen formation (during squaring) or after pollination can limit fertilization efficiency and increase fruit shed.

Shedding can be increased by too little or too much water. It has been well documented that drought conditions can increase the rate of boll abscission. Drought causes reductions in leaf area and photosynthetic efficiency that limit the number of fruit the crop is able to support. The crop is particularly sensitive to drought from early flowering to peak bloom, with two-bail reductions in yield observed previously in Georgia (Chastain et al., 2016) for dryland cotton when compared with a well-watered control. Although typically less of a concern, too much water can also decrease fruit retention, which is particularly relevant for the 2021 growing season. For example, excessively wet growing seasons can limit fruit retention by producing excess vegetative growth (Ermanis et al., 2021), which shades lower leaves and fruiting sites. Mature pollen is also sensitive to moisture and will burst soon after it comes into direct contact with water droplets. Timing and volume of water applied to a flower will influence percent seed set and fruit abscission rates. Sprinkler induced fruit shed and yield loss has been documented in the Texas high plains, provided that irrigation was received at a time during the day after pollination had already occurred (Burke, 2003).

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Therefore, it is reasonable to assume that the frequent and intense pop-up storms we have experienced throughout the 2021 growing may negatively impact seed set or fruit retention, so growers should consider management strategies that allow the crop to adequately compensate for fruit loss as described elsewhere in this newsletter.

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Weather and Climate Outlook for August and Beyond (*Pam Knox*): After a couple of hot days, the beginning of August is expected to be cooler and wetter than normal, especially across the southern half of Georgia, as a nearly stationary front is expected to sit over the area for a lot of the week. This means lower temperatures, especially during the day, less solar radiation, and higher humidity. Those conditions will lead to increases in pressure on crops by fungal diseases, especially once we return to higher temperatures in the second week. The rest of the month is expected to continue to be wetter than normal, although the rain will be spotty as summer rains often are. Temperatures will continue to be mild although after the first week they will stay close to normal and we may some periods of hot weather as well. Climatologists don't see any big changes in the weather patterns for the next couple of months, so I continue to expect wetter than normal conditions and seasonal temperatures for most of the rest of the growing season.

The tropics have been fairly quiet for the last month since the early flurry of storms. This is typical for July and early August, compared to last year which was not typical at all. The long-range models are starting to show storms developing in the Main Development Area of the Atlantic Ocean as dust off of Africa decreases and the waves coming west off of Africa become stronger and more frequent. The main tropical development period is August 15 through October 15, although storms can certainly occur after that. The

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forecasts for the season continue to be for more named storms than usual, so once the season gets going again, we can expect to see a fair amount of activity. Of course, we don't know where those storms will go, so they may or may not affect producers this year.

We are currently in a La Niña watch. That means that even though we are currently in neutral conditions, we are expected to go back into a La Niña by late fall. This means that the late fall and winter are likely to be warmer and drier than usual, especially in southern Georgia and Alabama and northern Florida. Even though that is statistically the most likely climate for a La Niña winter, last year was an exception due to the occurrence of a Sudden Stratospheric Warming (SSW) event which drove cold air down through the central US in February. We don't often get SSW events two years in a row, so the statistics say that warmer and drier this winter is still the best bet. We often get droughts in the summer after a La Niña, but not always, as this year can attest.

As the rally in cotton prices rolls on, signs of caution grow about the road ahead (*Serrina Liu*): Cotton prices surged recently to the upper 80 cents per pound and even reached as high as 91.51 cents per pound for front month cotton futures (Cotton #2 Oct' 21) on July 28, 2021. Price went down slightly afterward but still in the upper 80 cents per pound. There are several contributing factors for the recent rally of cotton prices, including record-high stock market, speculation purchase of cotton futures, weak U.S. dollar, and Chinese purchase of U.S. cotton. Looking ahead to the future months for this year's crop, producers need to be aware of the market risk and the potential decline in cotton prices.

The fuel is running out for the continued rising of cotton prices. The weather conditions this year favors U.S. cotton production across the cotton belt. We could end up with a high production level for cotton this year with continuing favorable weather conditions. Whenever there is a large supply, cotton prices tend to trend down. Additionally, the rising Covid cases due to Delta variant in the U.S. and globally could stall economic recovery after an early rebound and impose higher market risks. As the cotton prices tend to follow the stock market prices, there are rising market risks for cotton prices. Furthermore, China has significantly increased the purchase of U.S. cotton for 2020 and 2021. This is due to the Phase One Trade Deal. China agreed to purchase at least $40 billion worth of agricultural products for each of the two years (2020 and 2021) on top of its purchases in 2017. However, China's purchase obligation under the Phase One Trade Deal will only last until the end of this year. There is uncertainty for future year's of cotton purchase by China. With all of these factors, the pace of gains in cotton prices has slowed.

So what should producers do? Should producers lock in the price for part of their 2021 crop, or should producers wait for the next round of prices rally to sell? As there will always be the market uncertainty in prices and the regret and feelings of loss of sales opportunity for not selling at the peak, what producers need to look into is whether they can lock in the prices above their breakeven prices. If they can sell their cotton at breakeven prices, that would ensure that they will be economically sustainable for their operation. For any market opportunity, if they can sell their cotton above their breakeven prices, it is a good selling opportunity, and producers would make a profit from the sale. According to UGA 2021 Crop Comparision Tool Updated in May 2021, the breakeven cotton prices for total costs, which cover the variable costs and fixed costs, range from 75 to 88 cents per pound. At the current cotton prices, producers would be able to

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cover their in-season variable costs for planting, growing, and harvesting (variable costs) and also be able to cover their long-term depreciation costs (fixed costs).
Another area that cotton producers need to be aware of is the rising of input prices. As the pandemic severely disrupted the supply chain, there is a shortage of input supply globally, resulting in rising input prices. Also, the inflation pressure in the U.S. and globally further pushes the input prices. With the rising of input prices, farmers also need to be more cautious about their input usage.

Table 1 Breakeven price for variable costs and total cost for Georgia Cotton Production.

	Conventional Tillage		Strip Tillage	
	Irrigated	Dryland	Irrigated	Dryland
Breakeven Price (Variable Cost)	$0.49/lb	$0.62/lb	$0.50/lb	$0.65/lb
Breakeven Price (Total Costs)	$0.75/lb	$0.86/lb	$0.77/lb	$0.88/lb

*The breakeven price is calculated under the assumption of cotton yield at 1,200 lbs/acre for irrigated cotton and 750 lbs/acre for dryland cotton. If the producer has a higher yield or fewer input costs, the breakeven price for their operation could be lower.

Stinkbug Management (*Phillip Roberts*): Southern green and brown stink bugs are the two most common stink bugs infesting Georgia cotton. Both have sucking mouthparts and damage cotton by feeding on the seeds of developing cotton bolls. In addition to mechanical damage, feeding allows for the introduction of boll rot pathogens. Internal symptoms of feeding on medium sized bolls are the most reliable indicator of stink bug infestations. Internal damage is defined as warts or callous growths on the inner surface of the boll wall and/or stained lint. This wart or callous growth is easily visible less than 48 hours after the stink bug fed on the boll. 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.

Scouting for stink bugs should be a priority as plants begin to set bolls. In addition to being observant for stink bugs, scouts should assess stink bug damage by quantifying the percentage of bolls with internal damage. Bolls approximately the diameter of a quarter should be examined. Bolls of this age are preferred feeding sites for stink bugs can be easily squashed between your thumb and forefinger. It is important that bolls of this size (soft) are selected. The number of bolls per plant which are susceptible to stink bugs is not constant and varies during the year. The greatest number of susceptible bolls per plant generally occurs during weeks 3-5 of bloom. During early bloom there are relatively few bolls present. During late bloom, many bolls are present but only a limited number may be susceptible to stink bug damage (individual bolls are susceptible to stink bugs in terms of yield loss until approximately 25 days of age). 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

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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). Environmental factors such as drought and/or other plant stresses may cause susceptible boll distribution to vary when normal crop growth and development is impacted; thresholds should be adjusted accordingly. Detection of 1 stink bug per 6 feet of row would also justify treatment.

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.
- Determine ratio of southern green to brown stink bugs, organophosphates provide better control of brown stink bugs compared with southern green.
- 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.

Important Dates:

Southeast Research and Education Center Field Day (Midville, GA) – August 11
Southwest Research and Education Center Field Day (Plains, GA) – August 31
Cotton and Peanut Research Field Day (Tifton, GA) – September 8
Northeast Georgia Cotton Field Day (Athens, GA) – September 28

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