UNIVERSITY OF GEORGIA EXTENSION

UGA Cotton Team Newsletter
July 9, 2020

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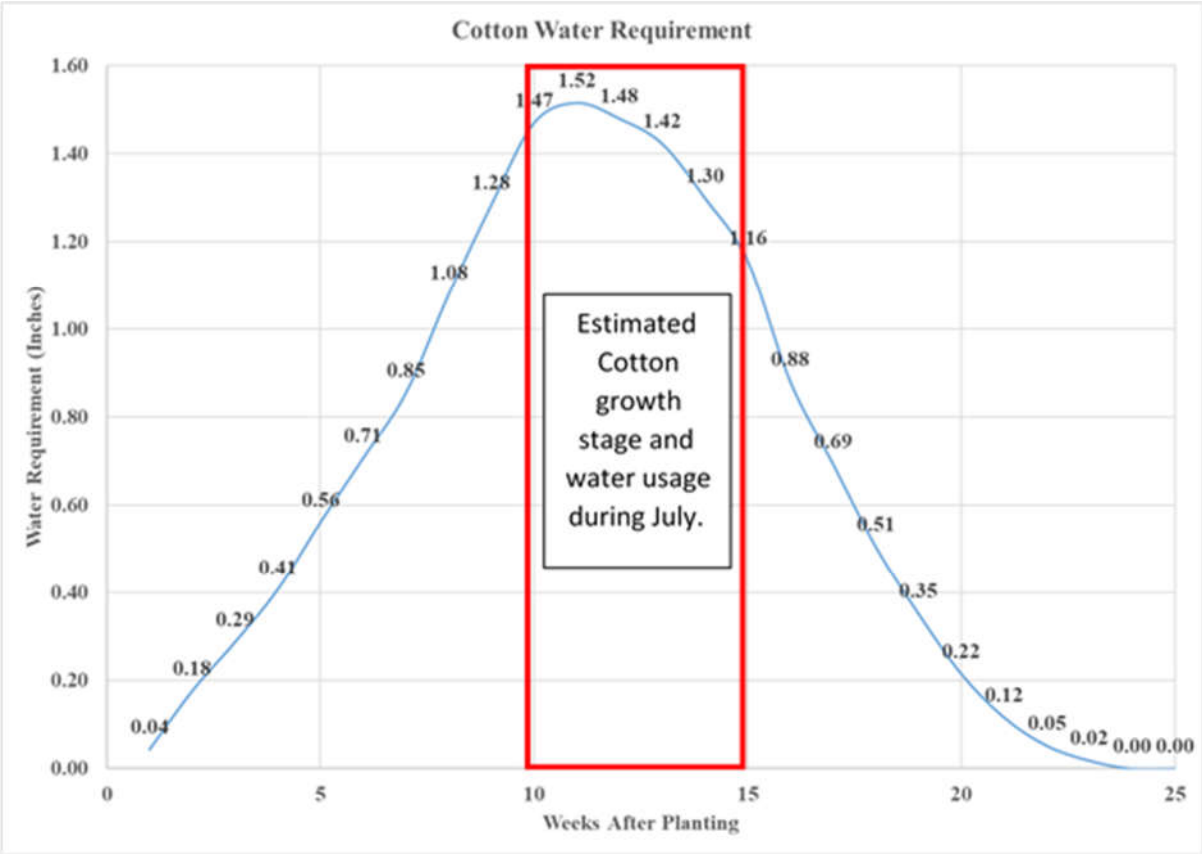
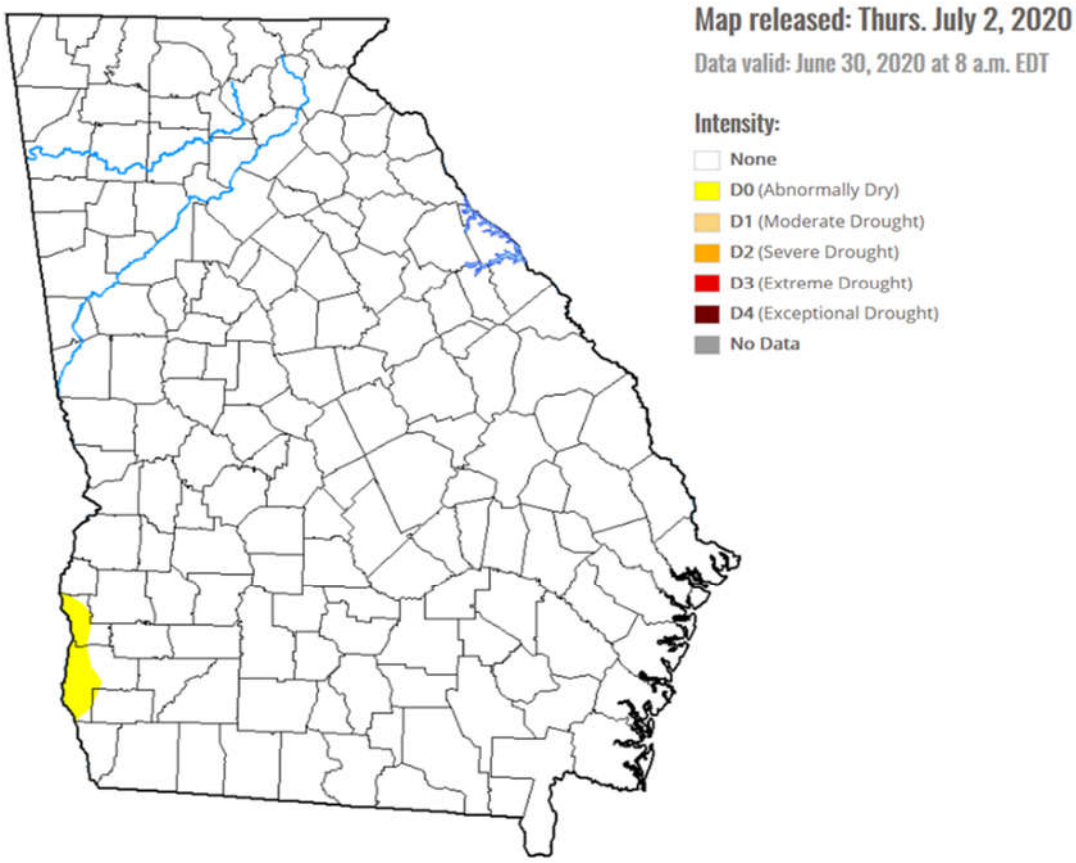
Mid-Season Cotton Irrigation Considerations Title (Cale Cloud, Extension Water Agent, David Hall, Extension Water Educator, and Wesley Porter, Extension Precision Ag and Irrigation Specialist):
Cotton that was planted during May in Georgia should be squaring by now and approaching bloom, if it hasn't already began blooming. Bloom occurs roughly 9 weeks after planting and water requirements really ramp up and approach peak demand during this time. Irrigation requirements and demands are very critical during the "First flower to first open boll" period of development. This growth stage takes place during weeks 9-17 after planting. Thus, based on when your cotton was planted, you will probably enter peak demand during the month of July. During this stage, cotton may require up to 1.5 inches per week or 0.2 inches per day. Keep in mind that the Soil Water Holding Capacity of most of our soils is around 1.0 inches/foot of soil. The crop can only access water where it has roots and of this SWHC only about 50% of it is plant available. Thus, a cotton plant with an 18 inch rooting depth will have access to 0.75 inches of water at field capacity, meaning it will require irrigation every 3 to 4 days minimum based on rainfall and irrigation efficiency during this stage. It is important not to let your cotton crop experience water stress during the flowering stage, as stress during this stage can reduce plant growth which in return can reduce the number of fruiting sites that are initiated.
The main thing to keep in mind is that these water requirements are based on a historical average and that the crop may not necessarily need or use the amount of water as shown in the graph below. If you have cooler and cloudier or more humid days, your crop may not use nearly as much as it would if it would on a hot, sunny, and dry day. The graph below should give you a good idea of your weekly water requirements through the month of July IF you planted between mid-April and mid-May.



Just so you have an idea of where the state stands as of the end of June below is the current GA Drought Monitor Map (https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?GA). As can be seen via the map, we are currently in not in a drought anywhere in the state. There is a very small area of Abnormally Dry in the far southwestern part of the state. This can change rapidly however, so keep that in mind.



July Begins the "Red Zone" for Target Spot (Bob Kemerait, Extension Plant Pathologist):
The Debate. I recently followed a thread on social media where the need for applying fungicides to cotton for control of target spot was debated. As you might imagine, opinions were varied from "yes we are going to spray" to "spraying fungicides on cotton doesn't make us any money". As the contributors to the conversation farmed cotton across the United States, it was not surprising that opinions differed and that farmers most likely to use fungicides were in the Southeast and those less-likely were in the West. My stance for management of target spot (and areolate mildew) continues to be that not every cotton grower in Georgia needs to treat every season, but that every grower needs to assess their situation carefully and that use of fungicides can protect yield and improve profits.

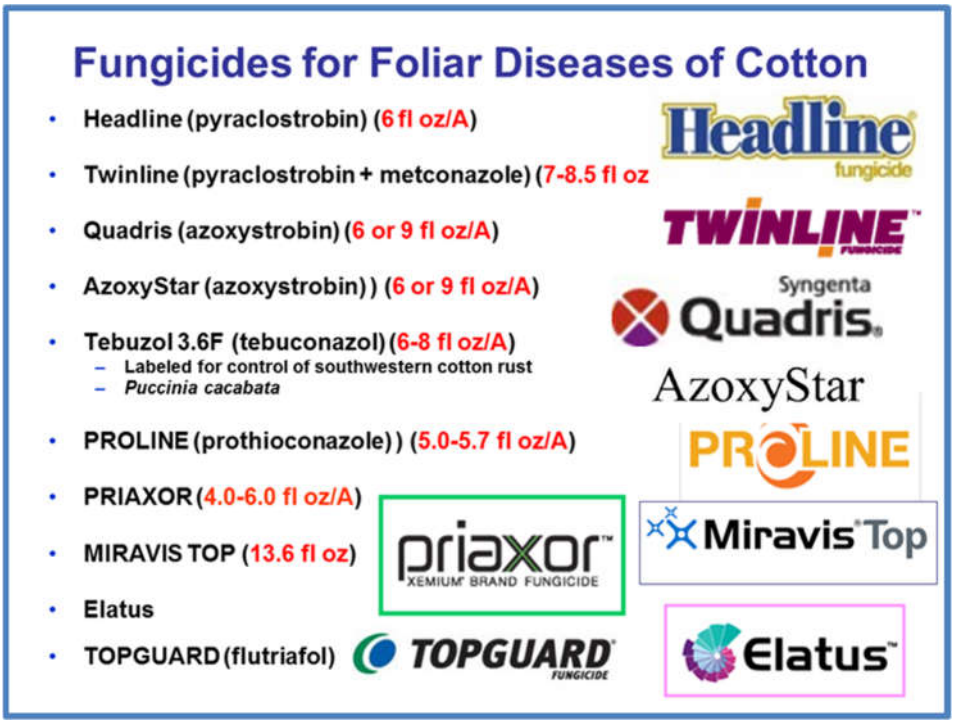
Losses to Target Spot. From our research here in Georgia, it is documented that target spot can easily reduce yields by 150-200 lb lint/A. In some situations, the amount of lint lost to this disease may be higher, in other situations less lint may be lost. The factors that determine how much yield loss will occur is tied primarily to a) time at which infections occurs (earlier infection results in greater yield loss),

b) environmental conditions (wetter years increase opportunities for development of disease and also lead to better crop growth that favors prolonged leaf-wetness periods for infection), c) yield potential (fields with higher yield potential tend to be at greater risk to target spot), d) rotation (cotton-cotton rotations likely increase risk to target spot), and e) location (cotton in southern Georgia has significantly greater risk to target spot than does cotton in northern Georgia). Varieties may also differ in susceptibility to target spot, though all cotton varieties are susceptible to one degree or another and may benefit from use of a fungicide.

Management of Target Spot. The most effective way to manage target spot is with the use of well-timed fungicide applications. I recommend that growers begin to scout for the classic marble-sized, target-like lesions in the LOWER CANOPY of the crop beginning at the first week of bloom. (Note: Stemphylium leaf spot, which results from deficiencies of potassium in the cotton plants, can be mistakenly identified as target spot by the untrained eye. While spots associated with target spot are initially found in the lower canopy of "good" cotton, Stemphylium leaf spot is found across the entire canopy of "poorer-growth" cotton that often has red and yellow coloration. This is important because use of fungicides DOES NOT protect a cotton crop from Stemphylium leaf spot.)

If target spot is not found in the lower canopy at the first week of bloom, growers are encouraged to continue scouting for the disease on a weekly basis. If the disease has not been found by the 6th week of bloom, then it is likely that the crop will not need a fungicide application, even if target spot appears later. However, if target spot is observed within the first six weeks of bloom, and where there is favorable weather for disease development and good yield potential, then use of a fungicide is likely warranted. The "best" time to apply a fungicide occurs when the initial symptoms of target spot appear in the field. Growers who are not able to scout should consider a fungicide application at the 3rd week of bloom and possibly a second application 2-3 weeks later is conditions remain favorable for disease development and spread. Note: Target spot can be an explosive disease when conditions are favorable (i.e., prolonged periods of leaf wetness). In a worst-case scenario, 80% defoliation can occur within two weeks after initial symptoms. Therefore, if fungicides are to be beneficial, they MUST be timely. If a field has already lost 50% of its foliage when the disease is observed, then there is little reason to treat with a fungicide.

Fungicides for controlling target spot. Below is a chart of fungicide labeled for use on cotton. The most effective fungicide for management of target spot is Priaxor; Miravis Top has also been a very good fungicide. Headline is likely our next best option for control of target spot; followed by azoxystrobin products such as Quadris and AzoxyStar. Elatus, Proline, and TopGuard are also effective, but I have less data on them. Regardless of choice of fungicides, timing of application is absolutely critical.



How to Count Nodes (John Snider, Cotton Physiologist): Most people learn how to count when they are children. For those of us who specifically work with cotton, the ability to count properly is an essential skill that is revisited every growing season. For readers who are cotton veterans, this writeup will be a review, but for those readers who are new to cotton, I hope it will serve as an abbreviated guide to properly counting nodes for a specific purpose. First, it is important to specify that a node is the point of true leaf/branch attachment on the mainstem and the length of stem between nodes is referred to as the internode. It is equally as important to specify what isn't counted as a node. The cotyledons are the first, kidney bean shaped structures to appear above the soil surface, and they are the only "leaves" that are directly across from one another on the main stem. All other mainstem leaves that are added after the cotyledons with exhibit an alternate phyllotaxy, meaning that when a true leaf or branch is added to the mainstem, it is not directly opposite the previous leaf. The cotyledon "node" is not counted, and is sometimes referred to as node zero, and the first true leaf node above the cotyledons is the first counted node. While it is apparent where the cotyledons are early in the season (Figure 1A), they soon fall off, leaving scars. As the canopy gets larger, it is usually necessary to feel near the base of the stem for opposite scars (node zero) before counting true nodes. Similarly, at the top of the plant, it is important to note that when counting total nodes or nodes above white flower, we would only count to the uppermost unfolded mainstem leaf. If the leaf hasn't unfolded yet, it doesn't get counted in the total

number (Figure 1B). Figure 2A shows a cotton plant at the first flower stage of development. When all the leaves are stripped off it, we can clearly see the arrangement of nodes and internodes (Figure 2B). Cotton is said to have a 3/8 phyllotaxy, meaning that the next leaf up the main stem is 3/8 of a full turn from the previous leaf (the leaves rotate around the stem). Therefore, it is important for individuals to be hands on when they count nodes. Otherwise, they might miss a node that is hiding behind the mainstem.

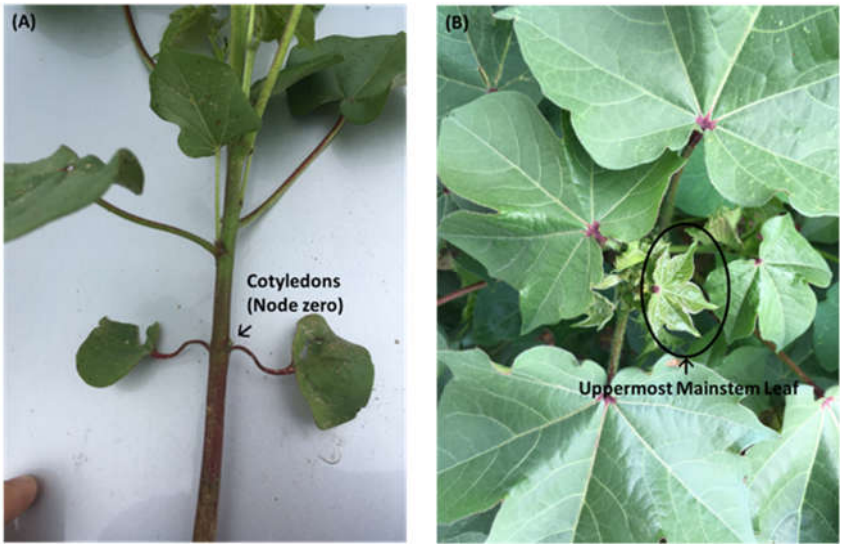


Figure 1. Young cotton plant with cotyledons still present near the base of the plant (A) and the uppermost unfurled leaf node (B) that would be included in a node count.

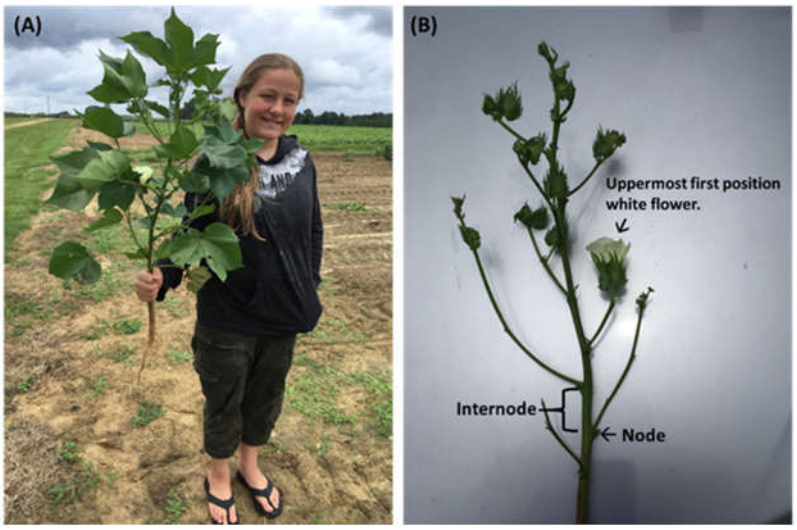


Figure 2. Cotton plant at first flower with leaves (A) and without leaves (B). Position of nodes and internodes is readily apparent in B.

The total number of nodes present on a cotton plant can be used to assess plant vigor or to provide an indication of stage of development. To get an accurate count of total nodes, it is necessary to start at the first true leaf node above the cotyledons (node 1) and count upward until reaching the uppermost unfurled leaf. A common pitfall in counting total nodes is that one may miss lower leaf nodes that shed as the canopy gets larger. It is especially important to be hands on in this situation because the only way to get a true count of total nodes in a dense canopy is to feel the scars on the mainstem where the earliest true leaves used to be.

For PGR management, it is not always necessary to count all nodes since the region of active stem elongation is near the top of the plant. Growth management using PGRs is a topic to which an entire newsletter could be devoted, but this is not our purpose here. What is important is that it is often necessary to know the length of the fourth internode. The fourth internode would be the length of stem between the fourth and fifth node. Obviously, cotton variety, environmental conditions, PGR timing, and application rate are important considerations, but as a general rule, a fourth internode length greater than 2 to 3 inches indicates a need for PGR application. A simplified version of this for those of us who don't carry rulers around with us all the time is to determine if three or more fingers can fit in the fourth internode (Figure 3). If not, PGRs are likely not needed.

Figure 3. The top five nodes of a cotton plant at early flowering with the leaves removed so the internodes can be more easily visualized. Three fingers fitting between the fourth and fifth node with some wiggle room to spare indicates the need for PGR application.

The number of mainstem nodes above the uppermost first position white flower (NAWF) is probably one of the most commonly used methods for assessing crop development in cotton. NAWF at first flower provides an indicator of the crop's potential. A large number of NAWF (12 or more) indicates vigorous growth and high potential, but it may also indicate a need for more aggressive growth management. A low NAWF at first flower (somewhere around 5 or even slightly higher) indicates a limited number of fruiting sites and lower potential, but high yields can be obtained if fruit retention is high. The rate at which NAWF declines tells us a lot as well. For example, a high NAWF that does not decline as the season progresses is usually an indication of poor fruit retention because there is no boll load to divert photosynthate away from new vegetative growth. A high NAWF at first flower and a rapid decline in NAWF indicates high potential and good fruit retention. NAWF is also an important way to determine when cutout occurs. Cutout indicates a cessation of new vegetative growth and the flower produced at cutout will be the last effective bloom to contribute appreciably to yield. A NAWF of 5 is widely regarded

as cutout in many parts of the cotton belt, but some authors have suggested that an NAWF of 3 may be a more appropriate indicator of cutout for Georgia (Bednarz and Nichols, 2005). To properly count NAWF, first find the uppermost, first position white flower (not all plants will have a first position white flower on them when you sample). First position means that the flower is at the first fruiting site away from the mainstem. Count the node above it as node 1, and continue counting until you get to the uppermost unfurled leaf, which will be the last node counted.

Finally, at the end of the season it is important to count the number of nodes above the uppermost, first position cracked boll (NACB). An average NACB of 4, when obtained from a representative sample, is a good indicator of crop maturity for defoliation purposes. This count is a little different than the previous counts because we may not necessarily count all the way up to the uppermost node. Instead, we count to the uppermost node with a harvestable boll. There are a couple ways to decide whether a boll is "harvestable" or not. For example, the uppermost first position white flower identified at cutout will produce the last effective boll. Another way to define the uppermost harvestable boll is to identify the uppermost first position green boll that is firm and greater than an inch in diameter (Gwathmey et al., 2016). An accurate estimate of NACB is obtained by counting the node above the first position cracked boll as node 1 and the node with the uppermost harvestable boll as the last node included in the count.

References

Bednarz, C.W., R.L. Nichols. 2005. Phenological and morphological components of cotton crop maturity. Crop Sci. 45:1497-1503.

Gwathmey, O.C., M.P. Bange, and R. Brodrick. 2016. Cotton crop maturity: a compendium of measures and predictors. Field Crops Res. 191:41-53.

Forecast Remains Cloudy for the Cotton Market this Year (Yangxuan Liu, Extension Ag Economist): Since the first diagnosis of COVID-19, the spread of the pandemic worldwide has negatively affected global economic growth. According to the latest release by the Organization for Economic Cooperation and Development (OECD), global economic growth will decline by 6% to 7.6% in 2020, depending on whether there is a second wave of infections.

Similar trends are also observed for the U.S. economy. Real gross domestic product (GDP) in the U.S. decreased at an annual rate of 5% in the first quarter of 2020 (https://fred.stlouisfed.org/series/A191RL1Q225SBEA). The unemployment rate in the U.S. has reached its highest level since 1929, with a peak of 14.7% in April during the COVID-19 lockdown. The most recent unemployment rate is at 11.1% in June, indicating easing in the labor market since the reopening of the economy (https://fred.stlouisfed.org/series/UNRATE). However, with the current surge of cases in

the U.S. since reopening and as some of the hardest- hit states beginning to pause reopening, it is difficult to predict how long the pandemic's negative impact on the economy will continue.

As cotton and cotton-related products are discretionary items, COVID-19 has significantly impacted demand for cotton. The greatest decline in consumption has been observed in China and India. Retail sales in clothing and clothing accessories in the U.S. experienced an 87% decline in April from the previous year (https://fred.stlouisfed.org/series/RSCCAS). With the anticipation of a decline in consumers' consumption of apparel, the recovery of the spinning industry is anticipated to be slow.

Slightly lower production, reduced consumption and higher beginning and ending stocks are projected for the 2020 cotton crop globally. World cotton production in 2020 is forecast at 118.7 million bales, 3% (4.2 million bales) below the previous year. Global cotton mill use is forecast at 114.4 million bales in 2020, 11.5% (12 million bales) above 2019, but still significantly lower than 2017 and 2018 levels. The world ending stocks are also projected at 104.7 million bales, the second-highest level on record.

U.S. cotton production is projected at 19.5 million bales in 2020, 2% (400,000 bales) below the 2019 crop. However, this number will most likely be adjusted down due to weather-delayed planting in several states and reduced acreage in USDA's June Acreage report. The U.S. planted acreage for cotton was forecast at 12.2 million acres, down 11% (1.5 million acres) from last year. Fifteen of the 17 major cotton-producing states have declined in upland planted acres compared with 2019, with the largest decline in Texas. In Georgia, the planted acres declined to 1.2 million acres from 1.4 million acres in 2019. This decreased acreage nationwide is primarily due to lower prices and provides some opportunity for price recovery.

U.S. cotton exports are projected at 16.0 million bales for 2020, 1 million above the 2019 crop, and the third-highest on record. U.S. ending stocks are projected at 7.3 million bales in 2019 and 8 million bales in 2020. Stocks-use ratio is projected at 43% for 2020, the highest since 2007. This increase in ending stocks in the U.S. creates downward pressure on U.S. cotton prices. The season-average farm price is projected at 57 cents per pound in 2020 compared to 59 cents per pound in 2019 and 70.3 cents per pound in 2018. New crop December futures closed at 62.95 cents per pound on July 2.

Silverleaf Whitefly Management a Priority (Phillip Roberts, Extension Entomologist): Silverleaf whiteflies (SLWF) are being observed in areas which have historically had infestations. A few localized fields have exceeded threshold and been treated. These infestations are much earlier than normal and likely are a result of increased winter survival due to the lack of cold temperatures. Management of SLWF must be a priority. It is important that you know if SLWF are present in your area. When present

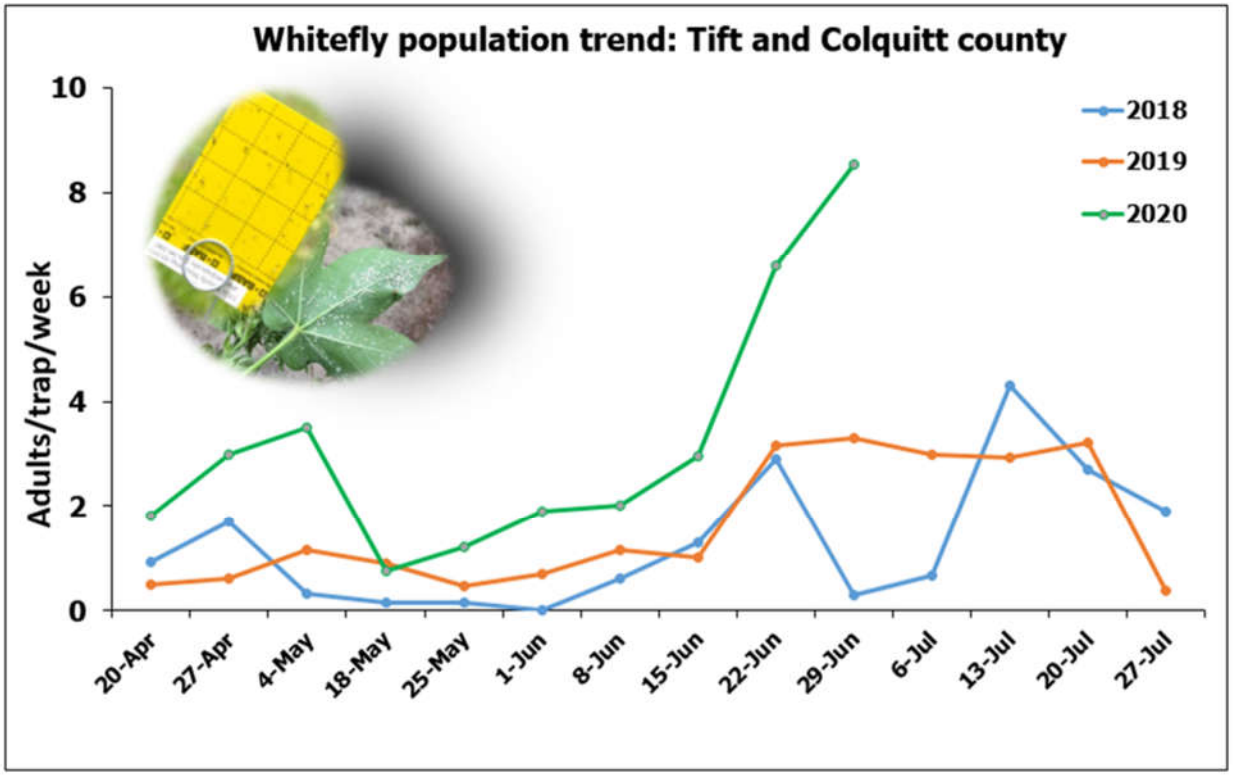
SLWF must be a part of every decision you make. Only spray insecticides for other pests based on the use of scouting and thresholds. Conservation of beneficial insects must be a priority. When treating other insect pests, avoid insecticides which are prone to flare SLWF. See the recent publication *Sampling and Managing Whiteflies in Georgia Cotton* for additional information at the following link: https://extension.uga.edu/publications/detail.html?number=C1184

SLWF adults infested leaf in terminal (left) and nymphs on the underside of the 5th mainstem leaf below the terminal (right).

Silverleaf Whitefly Trapping Update (Apurba Barman, Post-Doctoral Researcher, Entomology): *Dr. Apurba Barman provided the update below on June 29, 2020. Since this update SLWF infestations have significantly increased.*

(As of June 29th) We are already noticing whitefly adults on young cotton, especially in few fields across Tift and Colquitt County. At this point, adults are limited few adults per plant but likely to increase in coming days with favorable weather conditions during this time of the year. Comparing the whitefly

population trend based on the yellow sticky card captures during 2018, 2019 and this year, it is evident that the whitefly population is at an upward trend in Tift and Colquitt County. It concerns me when I see adults feeding on young, topmost leaf of cotton plant, because this is an indication that whitefly population is not just randomly flying, but they are on the verge of colonizing on that field and eventually numbers will increase. This would be a good time to start monitoring for whitefly population in our cotton fields and keep a close eye on the action threshold.



Important Dates:

Georgia Cotton Commission Annual Meeting and UGA Cotton Production Workshop – January 27, 2021