The University of Georgia
Cooperative Extension
College of Agricultural and Environmental Sciences

Georgia Cotton

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Cotton Planting

The widespread rainfall that covered nearly the entire state of Georgia during the weekend of April 24th seemed to be the trigger that motivated a lot of growers to begin, or accelerate, planting cotton. A few growers have been planting for a couple of weeks now, especially in dryland fields in attempt to capture soil moisture before it was depleted. Now that we have a little moisture to work with, cotton planting has gained momentum appreciably. As growers are now in a hurry to plant, there are still several considerations that should be taken into account, in order to avoid stand losses and replanting. Although replanting is something that nobody ever wants to do, it may be more important to avoid it this year as our replanting variety options may be limited. Most of the top-performing varieties were sold early on, and there may still be some bags of these varieties at local dealers, but at this point in the game, there is no guarantee that these top-performing varieties will be available for purchase if growers have to replant. With that in mind, growers should do all they can to establish an optimal stand and prevent losses.

Planting in optimal soil conditions is very important in achieving optimal germination and vigorous growth. Although the seed companies generally only bring high quality seed to the market, temperature and moisture play significant role in the establishment of the crop. We are currently coming out of a short cool spell (April 27th through 29th) where we experienced daytime highs in the low to mid 70's and nighttime lows in the mid 40's. Additionally, soil temperatures at a two-inch depth dipped into the very high 50's in Midville, Statesboro, and north of Tifton, and into the very low 60's in Tifton and further south. Many growers have probably planted in conditions similar to these several times in the past, without observing any adverse effects on germination or seedling vigor, especially when planting into well-drained and/or bedded soils. However, the risk of poor germination and vigor increases when planting in soil temperatures less than 65°F. Remember that germinating cotton seeds are very sensitive to cool temperatures within the first two to three days of imbibing water. Again, avoiding these risks may be more important this year than in others for multiple reasons. Growers are currently

at the beginning of their planting season, therefore waiting a short time for suitable planting conditions to return is still an option. The urge to plant into moisture in dryland fields often takes precedence over waiting for optimal soil temperatures for some growers. Close observation of expected rain events and high/low temperatures within five days of the anticipated planting date can aid growers in making these decisions. In addition, observing soil temperatures at the 2, 4, and 8-inch depths (www.georgiaweather.net), and any changes in soil temperatures that occur over several days, can provide useful information in determining when it is safe to plant. Temperatures at the 4 and 8-inch depths could also be an indicator of the warming capacity of the soil, or the likeliness of rapid cooling, when encountering a short-lived cool spell. Hopefully, the current cool spell will be the last.

Utilizing optimal seeding rates and planting depths are also very important in establishing a good stand. Planting at a rate of 2.5 seed per linear row foot, or a hill-dropped system consisting of 2 seed per hill with hills spaced 9 to 10 inches apart, is generally our standard planting rate. This rate generally allows for optimal plant stands, growth, canopy architecture, maturity, and yield. Reducing seeding rates below this standard could lead to poor stands, delayed maturity, erratic and inconsistent plant growth, and possibly reduced yields, even if planting larger-seeded varieties, and/or if planting conditions are favorable. If planting conditions are unfavorable, this rate could be slightly increased. Some growers may also want to utilize or capture available soil moisture by deep planting. Cotton in Georgia should be planted at depths between 0.75 and 1.25 inches but not greater than 1.25 inches. Planting on the shallower end of this spectrum is advised when encountering unfavorable soil or environmental conditions, or if surface crusting is likely. Deep planting in unfavorable soil temperatures, or in soils that tend to crust, could lead to germination and emergence problems. Planting at depths closer to 1.25 inches is only appropriate when planting in good soil moisture, warm soil temperatures, and in well-drained soils without the potential for crusting.

Plant stands should be evaluated very soon after emergence. Replant decisions are far more difficult to make as time elapses. Every field situation seems to be different, and there are several factors to take into account, when considering saving or replanting a sub-optimal stand, such as costs, herbicide options or limitations, how much time is left to plant, delays in maturity, and yield potential, among others. Therefore, it is imperative to evaluate the crop and make these decisions promptly. When evaluating a plant stand, take a mental note of stand losses and try to visualize what an optimal stand would look like. If planting 2.5 seed per foot on 36-inch rows, then you would expect to see a stand of approximately 2 plants per row foot. Comparing the stand losses to an optimal stand could provide insight on how much yield may be lost. Additionally, observing the size of gaps between plants may provide insight regarding potential effects on weed control, maturity and canopy architecture. Small, evenly spaced and infrequent gaps between plants may have little impact on maturity, architecture, or yield. Frequent gaps of 2 to 3 feet however could significantly impact yield and could lead to delays in maturity, as the plants adjacent to these gaps could only compensate for space by forming more outer position and/or vegetative branches or bolls. Additionally, these plants may often produce very thick stalks to support the additional growth of vegetative branches, and if this type of plant structure is observed throughout the field, then harvest efficiency may also be affected. Observing the size and frequency of these gaps compared to a mental “optimal stand” could help determine potential yield losses and the advantages/disadvantages of replanting.

Controlling Emerged Palmer amaranth At Planting

Glyphosate-resistant Palmer amaranth has already emerged in many cotton fields. It is critical that growers control these emerged plants before planting their cotton crop. If the Palmer amaranth population is resistant to Roundup, then one of the more effective mixtures would be an application of paraquat (Gramoxone, others) plus diuron (Direx, others) plus crop oil (Table 1). Mixtures of diuron with paraquat are often far more effective than paraquat applied alone. Other effective options do exist including a burndown application of Ignite. Ignite can be an effective treatment depending on the rate of Ignite applied and size of Palmer amaranth at application timing. Currently, we are evaluating more closely the rate of Ignite needed for Palmer amaranth as it increases in size. As of the data generated to date, we would estimate that 22 oz/A of Ignite would control 2 inch Palmer, 29-32 oz/A of Ignite would control 3 inch Palmer, and 40 oz/A of Ignite would control 6 inch Palmer (these recommendations will likely be adjusted once more data is generated). Combinations of Ignite plus diuron are being studied but the effectiveness of this mixture is currently not completely understood.

It is critical that paraquat or Ignite applications be made in at least 15 gallons of water per acre using flat fan (some type of drift guard, hopefully) spray nozzles. Read and follow all labels regarding plant back restrictions and rates of herbicides to be used on your soil type.

Table 1. Six-inch glyphosate-resistant Palmer amaranth response to burndown herbicide treatments.*

Herbicide treatments	Rate(s)/A	Control (%)	
		7 d	24 d
Roundup WMax	22 oz/A	0 e	0 e
Gramoxone Inteon	2.0 pt/A	85 b	62 d
Gramoxone Inteon	4.0 pt/A	88 b	67 cd
2,4-D	2 pt/A	70 d	70 bcd
Clarity	8 oz/A	65 d	69 bcd
Direx	1.8 pt/A	79 c	74 bc
Gram. Inteon + Direx	2 pt + 1.8 pt/A	94 a	78 ab
Gram. Inteon + Direx	3 pt + 1.8 pt/A	96 a	87 a

*Crop oil concentrate included with all treatments except Roundup alone.

Abuse the Ignite System and You Will Lose Ignite Quickly

Numerous factors contributed to the development of glyphosate-resistant Palmer amaranth but certainly one factor was our over dependence of glyphosate with growers often making 3 or more applications per season. Glyphosate-resistant Palmer amaranth was confirmed in 2004 but was most likely first present in 2001 or 2002. Therefore, it only took 4 to 5 years once Roundup Ready cotton was commercialized until glyphosate-resistant Palmer amaranth was present in Georgia.

Numerous growers have now started down the over dependence path with Ignite. Palmer amaranth resistance to Ignite is inevitable if we decide to abuse this herbicide, and its loss will likely occur much more rapidly than noted with glyphosate resistance. ALL growers must adopt a programs approach when using Ignite (Table 2) and those growers making 3 or 4 applications of Ignite per season with few to no other herbicide in the management program must change their approach or they will likely ruin the effectiveness of the Ignite system for us all.

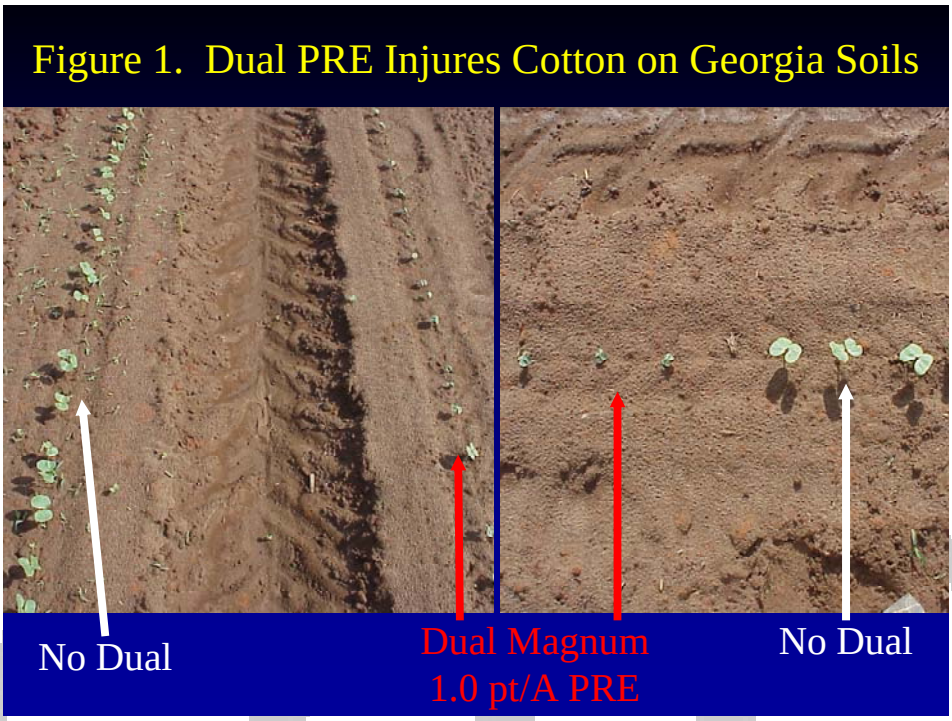
Table 2. Managing Palmer amaranth with Ignite-based programs.[1]

Preplant or Preemergence (PRE)[2]	Topical (3 inch Palmer)	Layby
Conventional Tillage: Reflex or Staple + Prowl PRE	Ignite 29 oz + Dual Magnum[3]	Direx + MSMA[4]
Conservation Tillage: Valor preplant; Staple + Prowl PRE or Diuron preplant; Reflex or Staple +Prowl PRE	Ignite 29 oz + Dual Magnum[3]	Direx + MSMA[4]

[1]Cotton must be tolerant to Ignite 280 (glufosinate) herbicide at 29 oz/A. Follow all labeled preplant herbicide plant back restrictions.
[2]The addition of paraquat is needed for all at plant applications if Palmer is emerged at time of application.
[3]A follow up application of Ignite will be needed if application is not timely or Dual is not activated by rainfall. Staple could be mixed with Ignite in place of Dual if Palmer is larger than 4 inches and not ALS resistant.
[4]Will not control grasses larger than 1 in. If grasses greater than 1 inch are present, an Ignite mixture will be required in Liberty Link cotton.

Do Not Use Dual or Any Product Containing Dual Preplant or Preemergence in Cotton

Injury from Dual products at planting can be severe on Georgia soils (Figure 1). Most Dual products can be applied once cotton reaches 3 inches in height, see label of the product used.



Cotton Scout Schools: Tifton June 14, Midville June 22, 2010

Cotton insect scouting schools are annually held at various locations in Georgia. These programs offer general information on cotton insects and scouting procedures and will serve as a review for experienced scouts and producers and as an introduction to cotton insect monitoring for new scouts. The annual Cotton Scout School in Tifton will be held on June 14, 2010 at the UGA Tifton Campus Conference Center. The Midville Cotton Scout School will be will be held on June 22, 2010 at the Southeast Georgia Research and Education Center. The training programs at each location will begin at 9:00 a.m. and conclude at 12:30 p.m.

Foliar Sprays for Early Season Thrips

Thrips are a consistent and predictable insect pest of Georgia cotton and most growers utilize an at-plant systemic insecticide for thrips control. Research and on-farm experiences demonstrate a consistent positive economic return when at plant insecticides such as Temik or the commercial seed treatments Cruiser or Gaucho are used. However, supplemental foliar insecticides may be needed in some situations. Foliar thrips insecticides should only be used on an as needed basis as foliar sprays increase the risk of flare-ups of other pests such as aphids or spider mites. The threshold for thrips on seedling cotton is *"Apply when 2-3 thrips per plant are counted and immatures are present. Treatment is rarely necessary after plants have 4-5 true leaves and are growing vigorously"*. The presence of immature (wingless and crème colored) thrips suggest that the at-plant insecticide is no longer providing control. Adult thrips deposit eggs in tender plant tissue and immature thrips will feed for about a week prior to pupating. Scout thrips by randomly pulling seedlings and slapping them against a stiff sheet of paper to dislodge the thrips. Be sure to look for immatures, adults will typically be light brown or black in color. Also pay

careful attention to newly expanding leaves in the terminal bud. Thrips damage results in crinkled malformed leaves, newly expanding leaves which are damaged may be blackened on the margins. Systemic foliar insecticides such as Bidrin, dimethoate, or Orthene are preferred treatments for foliar thrips applications.

Cotton which is planted in April and early May often experiences higher thrips infestations compared with later planting dates. Additionally, slow seedling growth associated with cool temperatures or other plant stresses increases the detrimental impact of thrips injury. Seedlings are most sensitive to thrips injury in terms of yield loss during early stages of development. Similar thrips infestations and injury will likely result in greater yield loss on 1-2 leaf cotton compared with 3-4 leaf cotton. It is rare that we observe a yield response to foliar thrips sprays applied to 5 leaf cotton, especially if the seedlings are actively growing.

Basic Disease Management Recommendations for Cotton

Though diseases affecting cotton in Georgia typically cause less damage than parasitic nematodes, diseases do cut yields in cotton fields across the state each and every year. The most common problems include seedling diseases such a "soreshin" caused by Rhizoctonia solani, foliar leaf spot diseases of less or greater importance, and boll rots, for which little can be done. Below are the key points from our management recommendations at the University of Georgia to reduce the severity of these diseases in our cotton fields.

1. **Practice crop rotation.** The primary seedling disease of cotton in Georgia is caused by *Rhizoctonia solani* which also affects many other crops as well, to include peanuts, soybeans, and many vegetables. Rotation with a grass crop like corn can help to reduce the amount of this fungal pathogen surviving in the soil when cotton is planted. Although rotation of cotton with peanuts will not reduce the populations of *Rhizoctonia solani*, this system will reduce the populations of southern root-knot nematode, the #1 most important parasitic nematode affecting cotton in Georgia. Fusarium wilt, an uncommon but serious problem of cotton in some areas of the state, typically only occurs where there are significant populations of root-knot nematodes.
2. **Plant cotton only in soils at 64° or warmer.** Cool soils delay germination of the cotton seeds and slow growth of the developing seedlings. Both of these situations allow fungal pathogens that cause seed rots, root rots, and soreshin, a competitive advantage and great affect on plant stand and early-season vigor. Soils tend to be cooler and wetter in fields planted to conservation or reduced tillage than to conventional tillage. Also, bedded land tends to warm more quickly than non-bedded land.
3. **Make practical and careful choices with regards to fungicides to manage seedling diseases.** All cotton seeds planted in Georgia should be treated with at least some base slate of fungicides; fungicides that are effective against *Rhizoctonia, Pythium*, and *Fusarium*. For most growers in most situations, the basic suite of fungicides that comes on all commercial cottonseed, e.g. RTU baytan-thiram-allegiance, provides the needed control of seedling disease for growers. However, research has demonstrated that in "worst case situations" where weather and large pathogen populations are stacked against

the cotton crop, use of additional seed treatments like Dynasty CST and Trilex systems can be beneficial. Use of in-furrow fungicides may also be helpful in such situations.

4. **Ensure adequate soil fertility, especially with regards to POTASSIUM.** Stemphylium leaf spot has historically been the most damaging of all foliar diseases to affect cotton in our state; Cercospora leaf spot can also be a problem as well. Both of these diseases are linked primarily to insufficient potassium levels in the plant, either from low levels in the soil, or insufficient rain or irrigation to carry the potassium to the foliage of the plant. Without enough potassium, the cotton leaves are all too vulnerable to attack by the fungal pathogens *Stemphylium solani* and *Cercospora gossypii*.
5. **Continue to follow updates for recommendations as to use of foliar-applied for management of leaf spot diseases.** Though we have seen some interesting results in our research plots where cotton is treated with fungicides such as Headline, Quadris, and Topsin-M, yield benefits have not been consistent enough for the development of specific recommendations for use of fungicides to manage leaf spot diseases. Management of diseases like Stemphylium leaf spot where the fundamental cause is a nutrient deficiency may never be practical with a fungicide. However, management of diseases such as Ascochyta "wet weather" blight and the newly identified Corynespora leaf spot may eventually be affected by well-time fungicide applications. We continue to study this opportunity.

In conclusion, though cotton is less-affected by disease than other crops, effective management strategies can help the grower to minimize losses and to maximize profits in his or her cotton fields.

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Your local County Extension Agent is a source of more information on these subjects.

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