



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



Georgia Cotton

September 1, 2007

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Crop Progress. (*Brown*) The 2007 crop is rapidly moving to maturity, though much of the non-irrigated crop is later than normal. August has brought record high temperatures, a lengthy drought, and in its last week, frequent scattered and sometimes heavy showers. In many areas, heat and drought have taken a serious toll on the crop. Boll rot has set in with a vengeance on some April and early May planted irrigated fields in the southern portion of the state. With a million acres of cotton across Georgia, there is truly a “mixed bag” of prospects. A few fields are ready for defoliation and harvest. With our irrigated crop being ready first, there will be a premium on timeliness of harvest, especially if September is wetter than normal. The USDA August 1 yield estimate of 792 lb/A and 1.65 million bales seems optimistic, but we are still hopeful. It is noteworthy that the August numbers were issued even before significant acreage had even commenced flowering. The next USDA estimate is due September 12, and it is anyone’s guess as to which direction it will go for Georgia.

Leaf Spots Causing Concern among Growers. (*Kemerait*) For the past month, the most common question we’ve received from county agents and growers about cotton has been, “What are all of these spots on cotton leaves?” Spotted cotton leaves have been sent to our diagnostic lab from across the state, and similar problems have been reported by Dr. John Mueller in South Carolina.

Most cotton growers associate leaf spots on their crops with periods of ample rainfall and cooler temperatures. Diseases such as *Ascochyta* (“wet weather”) blight are more severe as

environmental conditions develop that favor spread of the disease. However, much of the 2007 season has been plagued by drought and, at least recently, very hot temperatures.

Nearly all of the spots on cotton foliage sent to the UGA Plant Diagnostic Lab in Tifton have had similar appearance. In the mildest form, symptomatic leaves have a few small tan spots, often surrounded by a dark purple margin. In more severe cases, the small spots have expanded and at times coalesced into large necrotic areas on the leaf. The centers of the spots are often cracked and fall out as the spot matures, leaving a “shot hole” appearance in the affected leaf. In the worst-case scenario, growers report that what started in their field as a few spots in a small area rapidly progressed to many spots across much of the field and then devastating premature defoliation.

The culprit in the majority of the cases that we have seen has been a condition known as “Stemphylium leaf spot,” though *Stemphylium* leaf spot may occur as a complex with similar diseases caused by the pathogens *Alternaria* and *Cercospora*. *Stemphylium solani* is the fungal pathogen that actually causes the leaf spot; however, this fungus is a fairly weak pathogen despite the damage that it causes in cotton. In Georgia, we often attribute the true cause of this problem to potassium deficiency within the cotton plant. Insufficient potassium, either because of low soil levels or insufficient root uptake because of heat/drought, actually predisposes the crop to the potentially devastating disease.

Although insufficient potassium may play a critical role in *Stemphylium* leaf spot, it is reported that the disease can occur during periods of intense stress on the cotton plant; for example, from drought, nutrient deficiency, heavy boll load, and stress from nematodes and insects.

Control of *Stemphylium* leaf spot requires efforts to promote vigorous growth in the cotton crop and adequate soil fertility and nutrition. Growers can reduce risk to the disease by reducing stress on the crop through irrigation and pest management. Fungicides have been reported as a benefit in reducing the disease; however they may not be economical solutions.

Note: It is expected that Headline (pyraclostrobin) fungicide will receive a label for use on cotton this fall. We will continue to evaluate this product for the management of *Stemphylium* leaf spot. To be effective for management of leaf spot in cotton, Headline will need to be applied before symptoms progress in the field.

Leaf Scald. (*Brown*) In mid-August, there were several reports of leaf scald across the state. The typical occurrence involved (a) severely drought stressed cotton in which leaf temperatures were elevated, (b) a quick rain shower, (c) followed by sunshine. In such situations, plant cooling mechanisms associated with transpiration become compromised due to the lack of soil moisture, high temperature, and high relative humidity, making the foliage vulnerable to heat injury. Often, end plants, edge rows, and low areas were less affected because of greater soil moisture associated with increased root/soil area along ends and edges and/or higher available water in swags and bottoms. See the adjacent images taken by Jim Crawford of Jefferson County. Unfortunately, premature defoliation induced by leaf scald often results in immature fibers; specifically, low micronaire (an infrequent problem in Georgia) and short staple.



Cotton Insect Review. (*Roberts*) From an insect management standpoint, many will remember 2007 as a year of extremes. Thrips pressure was heavy and damage was common in April and early May planted cotton. Dry conditions prevented planting of many dryland acres until late May, with much of that cotton emerging in early to mid-June. Many growers opted to utilize a foliar insecticide thrips control program (no at-plant insecticide) on cotton which was “dusted in” during late May. Cotton which emerged in June had very low thrips pressure and a single foliar spray or no sprays were needed for thrips control. We should consider ourselves fortunate, and not assume that we can rely on a total foliar program for thrips control in future years. At plant insecticides for thrips control also provide aphid control, and in most years, excessive foliar sprays needed for thrips can exacerbate or make aphid populations worse. Spider mites may also be flared by excessive foliar sprays for thrips.

Where were the aphids? There were isolated fields which experienced heavy pressure, but as a whole, aphid infestations were low. When and if aphids built to high numbers they typically crashed quickly due to the naturally occurring fungus. There was increased interest in controlling aphids following the sustained populations observed during 2006, but insecticide applications were not needed for aphids on the majority of acres.

As in 2006, we expect that about 90 percent of the acres planted in 2007 were Bt cotton varieties. Corn earworm (CEW) infestations have ranged from light to moderate to extreme (some of the heaviest pressure I have observed in my 11 years at UGA). Bt cotton performed well as a whole, but supplemental treatment was needed due to the high pressure in some areas. When we defoliate this crop, some folks may be surprised at the level of damage which occurred. In 2005, we observed CEW populations which were difficult to control with pyrethroids. Laboratory bioassays indicated that tolerance to pyrethroids had increased in several CEW populations collected in Georgia during 2005. We increased monitoring efforts of CEW susceptibility to pyrethroids using Adult Vial Tests (moths placed in vials which have been treated with cypermethrin). During early July, survival in the vials was elevated and we were concerned about controlling CEW, especially if high pressure was observed. Survival in vials moderated in late July and August when compared with early July. There were a few problem fields where good control was not achieved, but for the most part, pyrethroids continued to provide good control. CEW susceptibility to pyrethroids is a significant issue not only in Georgia but also in other areas of the U.S.

To date stink bugs and other boll feeding bugs have been light to moderate. Although some acres are no longer attractive to stink bugs, many acres will be susceptible to stink bug damage until late September. Based on phone conversations and observations this week, stink bug activity is increasing. Late cotton will hopefully continue to receive timely rains and make cotton. Such late cotton will also be very attractive to stink bugs and other pests.

During 2006 we dodged a bullet relative to whiteflies. Unfortunately, whiteflies have been a serious concern for some growers during 2007. Do not underestimate the damage potential of whiteflies.

A year of extremes from an insect standpoint may be more the “norm” than the exception. For this reason, we recommend that all fields should be scouted and treated on an as needed basis. Year in and year out, SCOUTING PAYS.

Widestrike Cotton Tolerance to Glufosinate Herbicide. (*Culpepper*) Numerous questions have arisen regarding the tolerance of Widestrike cotton to topical applications of glufosinate (Ignite herbicide). Dow AgroSciences, the developer of PhytoGen cotton varieties and Widestrike cotton insect management technology, has recently released a statement (see below) addressing this issue. Similar to Dow AgroSciences and Bayer CropScience, The University of Georgia will not recommend topical applications of glufosinate over-the-top of Widestrike cotton. However, because this application is not an illegal application and because it has utility for the management of glyphosate resistant Palmer amaranth, we will be discussing research on Widestrike cotton tolerance to Ignite during our upcoming winter cotton production meetings. Any liability associated with this application is solely that of the user.



Glufosinate Ammonium Herbicide and WideStrike® Cotton Varieties

In an effort to find tools for the management of glyphosate resistant weeds – farmers, university scientists and other stakeholders in the cotton industry continue to express interest in the use of glufosinate ammonium (Ignite® herbicide) on PhytoGen® cotton varieties containing WideStrike *Insect Protection*. The points below summarize Dow AgroSciences’ position regarding the use of glufosinate ammonium on WideStrike cotton varieties.

- The PAT gene (which confers a level of tolerance to glufosinate ammonium herbicides) is the selectable marker in WideStrike cotton varieties.
- The tolerance to glufosinate ammonium herbicides provided by the PAT gene in WideStrike is not equivalent to the glufosinate ammonium herbicide tolerance of LibertyLink® cotton.
- While Ignite® herbicide is labeled for certain post-emergent use in non-tolerant cotton, over- the- top application of glufosinate ammonium herbicides on WideStrike cotton varieties may result in crop damage and loss.
- **PhytoGen and Dow AgroSciences do not recommend or warrant the use of glufosinate ammonium herbicides on WideStrike cotton.**

- **All risk of crop damage and loss associated with the use of glufosinate ammonium herbicides on WideStrike cotton remains solely with the user.**

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®PhytoGen is a trademark of PhytoGen Seed Company

®Ignite and LibertyLink are trademarks of Bayer Crop Science

The Future of Cotton Variety Development: The Effects of the Monsanto Purchase of D&PL. (*Brown*) A little over a year ago, Monsanto announced its intent to purchase D&PL for \$1.5 billion, and when the dust finally settled in June 2007, the deal was done. The arrangement brought D&PL, the world's largest cotton seed/variety company, under the umbrella of the world's most powerful cotton biotechnology company, but requirements imposed by the U.S. Department of Justice significantly affect the entire landscape of the cotton seed business.

As expected, Monsanto was required to sell its Stoneville interests, but stipulations of the deal went beyond that. For \$310 million, Bayer CropScience (FiberMax Cotton Seed) purchased not only the Stoneville picker cotton seed division with its varieties, germplasm, facilities, equipment, and personnel, but also received access to several important D&PL breeding lines and the Monsanto genetic marker library. The stripper cotton NexGen brand of Stoneville was purchased by Americot, a Texas-based company. In addition to divesting the Stoneville assets, Monsanto was required to maintain a favorable license agreement with these companies in the use of Monsanto traits. Syngenta's Bt-based VipCot lines already being advanced by D&PL were made available for return to Syngenta, while early efforts to incorporate DuPont herbicide technology into D&PL germplasm appear to have not been far along to warrant much consideration. Bayer is also afforded some special considerations on existing Cotton States varieties.

The Cotton States program is a vehicle for public (university and USDA) and private breeders to forward competitive lines to Monsanto for insertion of technology traits (for example, insect management and herbicide resistance). The aim is to have transgenic offerings of varieties initially bred by public and private breeders. While there a few commercial offerings presently marketed from that program, it has yet to provide competitive varieties for our region.

Monsanto is not sitting still. While most would recognize and appreciate Monsanto's huge past commitment (and success) to R&D in cotton biotechnology, the new Monsanto appears to be even more aggressive in terms of germplasm and cultivar development. There are reports that company breeding programs have been given the charge and resources to double their efforts. Vigorous investment into breeding will no doubt yield better products for cotton growers. "Bigger, better, faster" is the anticipated outcome of the acquisition.

For Georgia producers, the race to replace DP 555 BG/RR is on ... and the stakes are high (see article below).

Interestingly, in the southern U.S., the Monsanto business which now spans cotton, corn, soybeans, Roundup, Bollgard, etc., will be known as the Delta and Pine Land Business Unit. As

technical field personnel who formerly focused on cotton assume responsibility for every product under the Monsanto brand, there will be a challenge to NOT lose expertise and service on cotton.

Bayer CropScience has made significant investments to cotton breeding in the Southeast. They've had programs in Georgia and the Carolinas for several years now. Unfortunately, their only real, sustained successes thus far have been in Texas. While Texas has traditionally included a "saved seed" component and thus less annual seed sales than acres planted, success in a 6 million acre market is BIG success. It provides fuel to fund national expansion. Bayer's commitment to cotton is evident. They have been and will be a significant player in cotton cultivar development. In past months they've purchased market potential in California by acquiring CPCSD and now Stoneville in the Mid-South. In addition, FiberMax breeders should be "licking their chops" with access to the D&PL germplasm that came with the deal. At some point, these efforts should yield something good for us, shouldn't they?

Some have suggested we are now in a cotton variety duopoly, a market that has two dominant players Monsanto/D&PL and Bayer/FiberMax. That view discounts the potential of Dow Agrosciences PhytoGen cotton. In Georgia, they have arisen as a viable competitor in the alternatives to varieties other than DP 555 BG/RR. The performance of Dow's Widestrike technology is superior to Bollgard, not quite as good as Bollgard II, but priced competitively with Bollgard. The growing concerns with of glyphosate-resistant Palmer amaranth coupled with the (limited) tolerance of WideStrike varieties to glufosinate adds to the utility of PhytoGen's WR and WRF offerings (see the earlier article). Of course, the hairy nature of some PhytoGen varieties makes them more susceptible to whitefly problems, a localized but serious issue in south Georgia in 2007. PhytoGen has made a good initial splash. The challenge is to have a steady pipeline of new varieties that constantly get better in terms of yield and, hopefully, fiber quality. Can such a newcomer deliver?

What's Next Behind DP 555 BG/RR? (*Brown*) EPA granted re-registration of single gene Bt cotton technology in Bollgard cotton in July 2006 with an expiration date of September 2009. At face value, that means that Bollgard/Roundup Ready varieties will not be available to farmers past the 2009 season. It also means that growers will have to plant varieties other than DP 555 BG/RR, a remarkable, highly indeterminate, full season variety that has dominated our production since 2004 because it YIELDS.

Cotton producers choosing to plant insect technology -- and it is highly, highly unlikely that there will be a retreat to herbicide resistant-only or conventional varieties -- would then be forced to choose among the newer technology offerings, including Bollgard II/Roundup Ready Flex (BII/RF), WideStrike/Roundup Ready (WR), or WideStrike/Roundup Ready Flex (WRF). Monsanto has indicated that Bollgard II varieties will be available only with Roundup Ready Flex technology, while Dow expects to offer Widestrike with either Roundup Ready or Roundup Ready Flex.

The simple answer to the question "What's Next Behind DP 555 BG/RR?" is THERE IS NO CLEAR WINNER when we consider BII/RF, WR, and WRF varieties. To date, most of the newest BII/RF and RF varieties yield significantly less than DP 555 BG/RR. Perhaps data from the 2007 crop will uncover the next "race horse," but presently, nobody knows which, where, or

whose is the best candidate. If we are compelled to go forward without an option that is clearly as good as or superior to DP 555 BG/RR, it will be a step backward for us in terms of profit. Growers would likely pay more for the superior technology but make less cotton and less profit.

Technically, resistance management is a good, strong argument for conversion to two-gene Bt technology in Bollgard II, WideStrike, or similar technologies and a doing-away-with single gene Bollgard. Resistance is a problem that once encountered there is no starting over. So, the conversion to the two-gene Bt products is a good one for all growers, but it will be painful if there is no good replacement for the highest yielding variety Georgia cotton growers have ever planted.

Precision Agriculture - WAAS Satellite Changes. (*Perry*) For those using GPS for things like GPS soil sampling, light bars, yield monitoring, etc., you need to be aware of changes in the WAAS satellite system. WAAS (Wide Area Augmentation System) is the free DGPS correction service provided by the US Federal Aviation Administration (FAA).

The FAA decommissioned satellites PRN 122 and 134 on Tuesday, July 31, 2007. These two satellites have been providing WAAS DGPS correction signals to North America. New satellites PRN 135 and 138 went live on July 11 to provide the WAAS service. For North America, the 135 and 138 satellites will be THE source for WAAS. Note that the actual constellation of GPS satellites is not being affected, just the WAAS satellites, which are a separate group of satellites.

Because of this change, many GPS receivers will need to be updated or reconfigured to make use of the 135/138 satellites. Be aware that SOME units (especially older ones) may not be capable of tracking the new WAAS satellites. If you happen to use a subscription DGPS service (like Omnistar), your service will not be affected.

Farmworks has provided a good summary document of the WAAS satellite changes at the web site below. Farmworks notes that users of their compact flash (CF) receivers will not need to update to see the new satellites. Many folks (especially consultants and county agents) have these CF receivers used with their Dell or Ipaq pocketPCs. The appropriate web site is: www.farmworks.com/support/WAAS_satellite_change_071507.pdf

Also, Farmworks provides a link to Raven's WAAS document for how-to's on updating Raven receivers: www.ravenprecision.com/WAAS.pdf

For users of Trimble AgGPS 110, 114, 124, and 132 receivers, you can refer to the following document to help with verifying if your receiver is running the latest firmware (version 3.0) and how to load it if you are not using the latest. Note that some AgGPS 132 receivers will not be capable of tracking the new 135/138 satellites. That site is: trl.trimble.com/docushare/dsweb/Get/Document-343990/Agriculture_SprtBltn__WAAS_SBAS_P.pdf

Ag Leader has a document related to their products: www.agleader.com/docs/Support%20Note_WAAS_July07.pdf

For other products, consult the website or dealer for your specific product.

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