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

Georgia Cotton

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Irrigation Management for the 2012 Crop *(Collins & Whitaker)*

Most, if not all, of the early planted crop (planted during April and early May) began blooming during the late June or early July, and once cotton reaches first bloom, the demand for water becomes more and more critical. This demand will increase each subsequent week of bloom and likely peak during weeks 3 & 4 of the bloom period, then taper off towards the latter part of the bloom period. Most of Georgia has been blessed with some periodic rainfall so far this year, allowing the 2012 crop to get off to a decent start; however, because of the water holding capacity of our soils, we are never more than a few days away from a serious drought and many of us could easily see how extremely high temperatures (June 28th – July 1st) and low soil moisture can stress the crop.

When deciding when and how to irrigate, there are several considerations to make with regard to growth stage, size of field, watering capacity of a pivot, soil type and slope, temperatures, etc. Table 1 illustrates the quantity of water than needs to be supplied to a cotton crop in order to achieve optimal yields per week throughout the growing season. Our research in 2011 provided excellent evidence to support an irrigation scheduling program that follows the "recipe" provided in Table 1 to produce optimum yields. There is also a tremendous amount of research that indicates that a sensor-based program may also help manage water application efficiently and effectively.

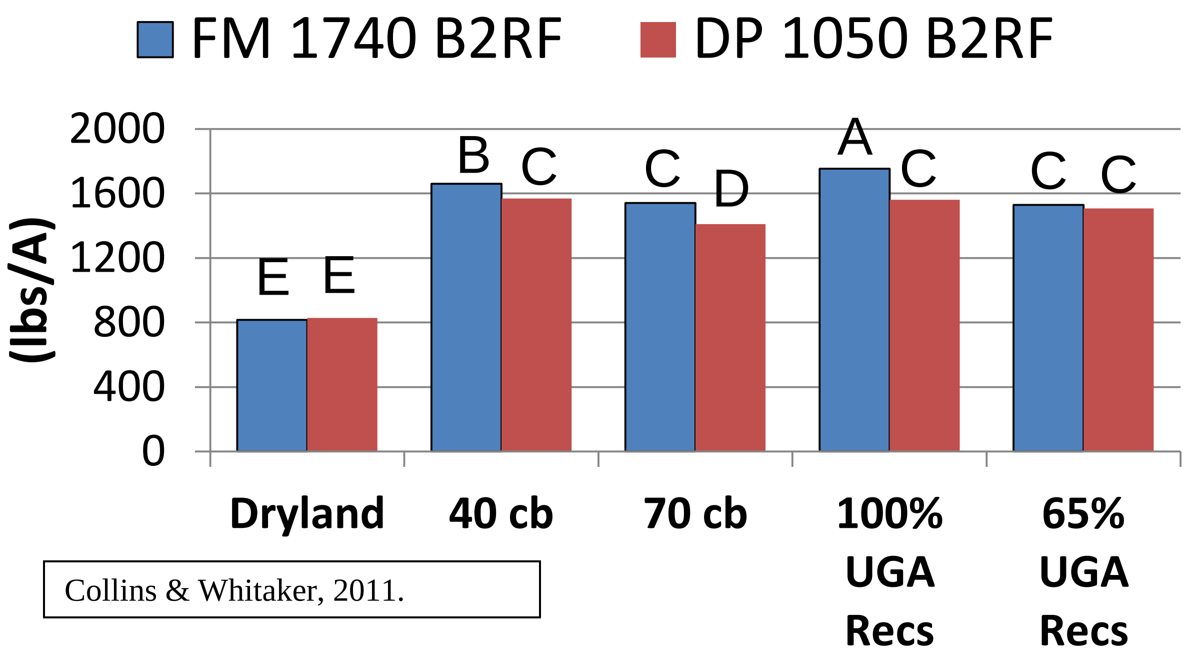
It should be noted that Table 1 is a guide and should be adjusted for various situations. Many irrigation systems are not suited to apply this amount of water per week (because of pivot size, soil water holding capacity, etc.) and therefore, using other methods or altering this "recipe" may be necessary. It is also important to understand that the guide presented in Table 1 follows a "normal" progression of bloom and crop development. Water requirements may be altered due to plant stress prior to bloom or other issues related to fruit retention throughout the bloom period. This chart could also be slightly adjusted for fields or varieties that bloom for 4 to 5 weeks versus 6 to 7 weeks. Research is currently underway to hopefully help understand how particular varieties respond to stress or moisture deficit before, during, and after the bloom period. It is also important to realize that most irrigation systems in Georgia are designed to supplement rainfall, not replace it, especially when extremely high temperatures and drought prevail during critical times. Therefore, optimum yields are more often than not achieved when Mother Nature decides to help with a little natural rainfall.

Table 1. Water Requirements of cotton by growth stage.

Week of Development	**Inches of Water per Week**
1st square to 1st bloom	0.75 - 1
Week beginning at 1st bloom	1
2nd wk. after 1st bloom	1.5
3rd wk. after 1st bloom	2
4th wk. after 1st bloom	2
5th wk. after 1st bloom	1.5
6th wk. after 1st bloom	1.5
7th wk. after 1st bloom	1
Post bloom – 1st open boll	0.75 - 1

For fields that cannot absorb these weekly amounts (significant slopes or stiffer soils), or in fields with larger pivots that cannot supply these weekly amounts, it is important to position particular varieties in situations where optimal yield may be realized, thus utilizing varieties with better "dryland" yield performance (varieties that consistently yield better than others in lower yield environments). Figure 1 illustrates performance of two common varieties in research trials conducted at the Stripling Irrigation Research Park and the Southeast Georgia Research & Education Center during 2011. Although it is far too late to consider variety positioning for the 2012 crop, this data could provide insight on how to manage varieties that vary in maturity, fruiting habit, and response to (and need of) applied water or rainfall.

Figure 1. Response of two varieties to various irrigation strategies averaged across two locations in 2011.



In Figure 1, notice that yields from DP 1050 B2RF were not statistically different for irrigating according to the weekly water requirements as seen in Table 1. or by reducing that amount down to 65% of requirements (according to Table 1). In other words, there was no yield penalty in DP 1050 B2RF from applying lower rates of water per week. Does this mean that growers should automatically apply less water to later-maturing or "more drought tolerant varieties"?? Without having more evidence to this, we would have to say NO…reducing irrigation amounts might work in some cases, however 65 percent of our recommended rates may prove ineffective if prolonged heat or drought were to occur during critical times.

This fact does provide insight on how this variety should be positioned and managed. Based on this 2011 research, varieties that respond to water similarly to DP 1050 B2RF could perhaps be positioned in fields with larger pivots or where water supply or crop uptake is limited. On the other hand, this data shows a significant yield response of FM 1740 B2F when the 100 percent checkbook method is used (or when more water is applied), suggesting that some earlier maturing varieties may respond more to increased irrigation, and could be positioned in smaller fields where water can be adequately and frequently supplied, or in more productive soils with greater yield potential.

Lastly, the use of soil moisture sensors may help improve efficiency of irrigation in some cases. Soil moisture sensors basically give us some sort of measurement to indicate how wet the soil is at any given time. Figure 1 also illustrates yield responses of the two aforementioned varieties to two soil moisture sensor-based irrigation treatments. In these trials, irrigation was applied according to the weekly UGA recommendations only when soil moisture sensors (Watermark® sensors) reached 40-cb (a relative wet soil moisture treatment) or 70-cb (a drier treatment). Although both sensor-based treatments improved yields over the dryland, irrigating when soils were slightly less depleted of moisture (the 40-cb treatment) improved yields for both varieties when compared to the drier irrigation trigger point of 70-cb, which helps us identify a level of soil moisture when cotton may become stressed to the point of possible yield reductions. It should be noted that in practical situations (pivots that require significant time to make a full circle), scheduling will likely need to be initiated at more wet soil moisture readings to ensure that the crop doesn't stress prior to irrigation water reaching the entire field. In the research provided here, irrigations were applied immediately after soil moisture reached the "trigger point".

Soil moisture sensors could also help growers adjust recommendations for soil type and growth stage. For example, some heavier soils may hold an inch of water for a longer period of time than sandier soils, therefore the use of a sensor could help trim off an irrigation or two throughout the entire season. Secondly, sensors could suggest when to resume irrigating following significant rainfall. Little is known with regard to how long a 3 to 4 inch rain will last, or how much of it the crop can effectively use, and is likely related to soil type, water holding capacity, depth to the clay layer, and the prevailing environment. The use of sensors can help growers know when the soil is approaching the point of being adversely dry again, and thus when to resume irrigation. Lastly, sensors could also help avoid excessive irrigation during times of low water demand (periods of cooler temperatures or lower boll demands), and may also indicate periods of significant water demand regardless of the variety planted….at critical growth stages or in periods of high temperatures or drought, a trigger point will likely be reached much more frequently than at other times.

US and Georgia 2012 Cotton Acreage *(Shurley)*

Back in March, farmers said they "intended" to plant 13.16 million acres of cotton for 2012—1.57 million acres or 10.7% less than last season.

Cotton prices started to decline, however, from around 90 to 95cents in February and March to 85 cents by early May and 75 to 80 cents by mid-May. During this same time, soybean prices were increasing. In peanut-producing states, peanuts also became a more attractive option due to the decline in cotton price.

As a result, actual 2012 US cotton acreage is estimated at 12.6 million acres—14% less than last year and 520,000 acres less than farmers said they intended to plant. Actual acres planted were less than intentions in 10 of 17 states.

US Cotton Acreage Planted, 2011 and 2012

	2011 Actual	2012 Intentions[1]	2012 Actual[2]	Change[3]
Alabama	460	400	390	-15.2%
Florida	122	110	115	-5.7%
Georgia	1,600	1,400	1,250	-21.9%
South Carolina	303	340	280	-7.6%
North Carolina	805	700	550	-31.7%
Virginia	116	95	85	-26.7%
TOTAL SOUTHEAST	**3,406**	**3,045**	**2,670**	**-21.6%**
Arkansas	680	590	580	-14.7%
Louisiana	295	270	230	-22.0%
Mississippi	630	580	580	-7.9%
Missouri	375	375	375	0.0%
Tennessee	495	420	380	-23.2%
TOTAL MID-SOUTH	**2,475**	**2,235**	**2,145**	**-13.3%**
Kansas	80	55	55	-31.3%
Oklahoma	415	350	330	-20.5%
Texas	7,570	6,813	6,813	-10.0%
TOTAL SOUTHWEST	**8,065**	**7,218**	**7,198**	**-10.8%**
Arizona	260	204	204	-21.5%
California	456	400	365	-20.0%
New Mexico	73	53	53	-27.4%
TOTAL WEST	**789**	**657**	**622**	**-21.2%**
TOTAL US	**14,735**	**13,155**	**12,635**	**-14.3%**

1/ *Prospective Plantings*, USDA, March 30, 2012. Thousand acres.
2/ *Acreage*, USDA, June 29, 2012. Thousand acres.
3/ 2012 Actual compared to 2011 Actual

Most of the additional 520,000 acre shift out of cotton is accounted for by 5 states—Georgia and North Carolina (each down 150K), South Carolina (down 60K), and Tennessee and Louisiana (both down 40K). The reasons for the shift--Georgia, North Carolina, and South Carolina made major increases in peanut acreage. All 5 states also show increased soybean acreage.

Georgia cotton planting is estimated at 1.25 million acres. This is 22% less than last year and 150,000 acres less than what farmers said they intended to plant back in March. Peanut acreage is up almost 50% from last year and 140,000 acres more than intentions. Soybean acres are also up from last year and higher than earlier intentions. Corn acreage in Georgia is down from last year.

Georgia Major Row Crop Acreage Planted

	2011 Actual	2012 Intentions[1]	2012 Actual[2]	Change[3]
Corn	345	340	335	-2.9%
Cotton	1,600	1,400	1,250	-21.9%
Grain Sorghum	50	60	55	10.0%
Peanuts	475	570	710	49.5%
Soybeans	155	150	190	22.6%
Tobacco[4]	11.9	10.0	10.5	-11.8%
Wheat	250	270	280	12.0%

1/ *Prospective Plantings*, USDA, March 30, 2012. Thousand acres.
2/ *Acreage*, USDA, June 29, 2012. Thousand acres.
3/ 2012 Actual compared to 2011 Actual
4/ Acres harvested/to be harvested

Cotton acreage may decline further in 2013 if unfavorable relative prices continue. Peanuts will also be key. With a big increase this year, will 2013 peanut prices be high enough to keep acres?

<u>Mid-Season Opportunities for Management of Nematodes and Diseases</u> ***(Kemerait)***

Early-season damage from nematodes has been a major concern for many cotton producers across Georgia this season. There have been numerous reports of fields where the cotton is severely stunted; much of this damage has been associated with the southern root-knot nematode (*Meloidogyne incognita*). Sting, reniform, and Columbia lance nematodes have all been linked to problems in a fewer number of fields; the most severe damage has been observed in Berrien County where some cotton is affected by nematodes and Fusarium wilt, a lethal combination.

Significant early-season damage from nematodes was anticipated this year for a couple of reasons. First, warm temperatures throughout the winter and the spring allowed the plant-parasitic nematodes to remain active longer into the winter, thus increasing populations in the field, and to become active earlier in the year. Second, the loss of Temik 15G created a situation where seed-treatment nematicides were deployed in fields where Temik or Telone II would have been a more appropriate choice. Vydate C-LV, 17 fl oz/A, is labeled for management of nematodes on cotton and is generally applied between the 2^{nd} and 7^{th} true-leaf stages to compliment and earlier application of another nematicide. Although this treatment may help growers in Georgia in some situations and it is certainly popular in areas of Mississippi and Alabama, Vydate is unlikely to be of much benefit in an effort to “rescue” cotton from severe, visible early-season damage.

Unfortunately for growers, there is little that can be done to rescue this year’s cotton crop from a difficult nematode problem; however it is not too early to plan for 2013. In fields where nematodes are a significant problem, growers should plan to rotate to a non-host crop like peanuts or perhaps consider planting a variety with resistance to southern rot-knot nematode. Growers may also want to consider fumigation with Telone II. Research is currently being conducted at the University of Georgia to assess the efficacy of site-specific applications of Telone II for greatest value to the grower. Research is also being conducted to compare yield potential where a more-resistant variety, e.g., Phytogen 367, is planted side-by-side with a high-yielding variety like Phytogen 499 protected with nematicides. The results of these studies will be available to growers for next season.

Target spot (Corynespora leaf spot) could be a more significant problem for cotton growers in Georgia this season. Although we have not diagnosed this disease as of the end of June, it is only a matter of time before it appears. From research conducted last earlier this year, it is clear that target spot can affect even young cotton if conditions are favorable. Heavy rains from tropical storms Beryl and Debby could have easily splashed spores from the soil and last year’s crop debris to the young cotton plants; however significant disease development probably won’t happen until there is enough foliage to trap humidity and extend leaf wetness periods. Cotton growers, especially in the southwestern part of the state, are encouraged to scout their cotton for the presence of “spots” and to have them diagnosed through Cooperative Extension. Where target spot is identified, growers are encouraged to weigh the benefits of a timely fungicide application. Although not every field where target spot is found will require a fungicide application, early development of this disease in a field with good growth and yield potential is certainly an important factor for the timely use of fungicide to protect profit for the

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

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