# Louisiana Cotton Bulletin

LSU AgCenter Cotton Research and Extension

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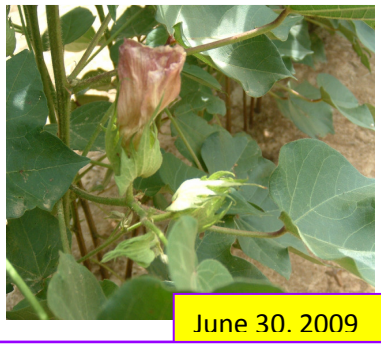
## ARTICLES THIS ISSUE





June 30, 2009

**Crop Report, June 30, 2009**
**Donald J. Boquet, PhD**

The percentage of cotton in Louisiana that is irrigated has increased in recent years to about 45%. This is partly due to an increase in acreage under irrigation but is mostly because of a decrease in non-irrigated acres. This year is rapidly becoming one in which irrigation will be very beneficial. Central Louisiana received significant rainfall on June 29, up to 3 inches in places, but the rest of the state remains extremely dry, especially the northeast region. The cotton fields that are irrigated are progressing ahead of schedule with the earliest planted cotton at 17 to 19 nodes and bolls retained at nodes 10 to 11. Keeping the crop growing in non-irrigated fields, however, is becoming more difficult. Having received only a few small showers in the cotton growing areas during the past 26 days has left these fields with many problems. At this time of year, we need a rain at least every 14 days to avoid drought stress. (See irrigation article below) Many of the fields that are flowering have lower than desired NAWF counts and it is a real concern that cutout will occur much too soon to produce good yields. Without a rapid change in rainfall probabilities, this will, in fact, likely happen. We also are rapidly approaching a situation in which we could set a few bolls and then have a much later second crop of bolls when rain does arrive. Fertilizers applied around and since planting time are still present and will be taken up with the next rainfall to initiate new growth. The dry weather has also contributed to extensive build ups of aphids and spider mites to go along with a few plant bug and worm infestations that required insecticide applications. With the stresses already on the plants from drought, additional stress from insects will be extremely damaging. These should be watched closely and controlled whenever thresholds are reached.

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## Cotton Irrigation

**Ernie Clawson, PhD**
**Donald Boquet, PhD**

The current dry conditions over most of the cotton growing area are causing severe stress to many cotton fields. The drought effects are showing up in cotton in many ways, including loss of squares and small bolls and reductions in rate of plant development and low NAWF at early bloom. Extended periods of drought are difficult to overcome and can be very detrimental to yield. Many of the stress effects of drought on cotton do not show up immediately but are delayed for days or weeks and often show up after a rain or irrigation has occurred. In these instances the rain event is blamed as the cause for effects such as shedding of fruit but these losses are, in fact, due to the earlier drought stress that occurred before the rainfall. To avoid drought effects, irrigation of cotton can be very important on most of the soils in Louisiana. On the droughty soils of the Macon Ridge, for example, irrigation has increased yield an average of 830 pounds of lint per acre for the past two years.

Crops lose water through their leaves and therefore the rates of cotton water use, often called evapotranspiration or ET, are dependent upon the leaf area of the crop. ET is beneficial and necessary to plants because the evaporation cools the plants and continuous water movement from roots through the stems to the leaves is necessary to translocate minerals and nutrients throughout the plant. Cotton ET is usually maximized near mid bloom, and can remain high beyond cutout until leaf aging and natural defoliation begin to affect the crop canopy. Past research has suggested an average ET of 0.22 inches per day in July and August and rates as high as 0.30 inches per day are certainly possible on individual days during that time period, especially during hot, dry and windy conditions. These ET rates are for cotton with ample water; once water becomes limiting, the ET rate will be slowed as the crop makes physiological adjustments for the lack of available water. Reduced ET is damaging to the plant, however, because of the loss of ET benefits described above.

The water taken up by the plants and used in ET results in depletion of soil water referred to as a water deficit. Daily accumulation of water deficits that are not replenished by rainfall or irrigation eventually leads to drought stress of cotton plants. The amount of accumulated water deficit a crop can tolerate without stressing is largely dependent on the soil type. Research in the LSU AgCenter has determined that cotton on alluvial silt loam soils can tolerate water deficits up to 4 inches without reducing yield. Deficits of 2 inches can reduce cotton yield on Sharkey clay and, on soils of the Macon Ridge, deficits of only 1.5 inches can reduce yields. Using an average ET of 0.25 inches per day during early- to mid-bloom, calculating when an irrigation may be needed and beneficial for cotton on different soil types is quiet easy to do. The high water-supplying capacity of Commerce silt loam means that cotton may not respond to irrigation until the water deficit exceeds 4 inches. With an average ET of 0.25 inches per day, irrigation on Commerce would then be needed only after 16 days with no rainfall. On Sharkey clay, irrigation may be needed every eight days and, on Macon Ridge soils every 6$^{th}$ day. These are only estimates, however. To effectively and efficiently schedule irrigation timing and quantity requires more complete information including the ET rate, accumulated water deficit, the available water in the root zone and capacity of the irrigation unit. Often, computer programs are used to track all the data that is needed to determine irrigation timing and specialized programs have been developed to enter, monitor and use the data.

Figure 1.Furrow irrigation of cotton, when possible, is usually more effective than overhead sprinkler irrigation because of the larger quantity of water that can be applied during each irrigation.

Figure 2. Sprinkler irrigation is common in Louisiana cotton because of field topographies unsuitable for furrow irrigation, but this method of irrigation during extended drought is less effective than furrow irrigation because the amount of water that can be efficiently applied is limited.

The Arkansas Irrigation Scheduler is an easy to use computer program available at http://www.aragriculture.org/computer_programs/irrigation_scheduling/default.asp. This particular scheduler was developed by a group of University of Arkansas Research and Extension Faculty. However, several LSU AgCenter field agents and research faculty are well versed in its use and can provide assistance to growers who want to use the program. It requires the producer to do some set up and enter into a spreadsheet certain inputs that include daily high temperatures, rainfall and irrigation amounts, planting dates, key growth stages, and the choice of a soil water depletion level at which to trigger irrigation. Correctly used, this program will use the data provided to it and calculate the optimal timing for scheduling of irrigation.

Another approach to efficient irrigation is to directly estimate the remaining available soil water content. Different types of instrumentation have been developed to specifically measure soil water availability and to help schedule irrigation timings. These instruments usually measure either water tension or soil electrical conductivity to estimate availability of soil water. Tensiometers give an accurate measure of how tightly the soil is holding the water (tension), which increases as water is depleted and water deficits increase. Tensiometers appear to be the most reliable soil moisture sensors readily available to producers at this time. Their limitations include the localized nature of the soil water status reading and constant maintenance requirements. Another option, the granular matrix sensor, is less accurate in many situations but can still show whether soil moisture is trending upward or downward at the depth at which the sensor is installed. Soil water availability below or above the instrumentation is not measured, so the entire root zone is not sampled, which is a major limitation of all the above devices. The neutron probe is the most accurate means of measuring soil water content and it can measure water content in the entire rooting zone. Although widely used in western states and evaluated in AgCenter research, this instrument has not caught on in Louisiana, probably because it is expensive and rather complex to set up, calibrate and use. Other types of instrumentation can be used to measure actual crop responses to water deficits by measuring physiological variables or canopy temperature but, in general, these methods are either complicated, expensive or not sensitive enough to detect drought stress soon enough to efficiently apply irrigation.

For assistance with irrigation scheduling please call upon the AgCenter personnel listed on the last page of this Newsletter. Any of the Cotton Extension Field Agents, Dr Ernie Clawson, research agronomist at the Northeast Research Station or Dr. Donald Boquet at the Macon Ridge Research Station can provide information and assistance with cotton irrigation.

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## Upcoming Events

**Concordia Field Day Tour – July 14, 2009**
**(Cotton-Soybean-Rice)**
**Contact Glen Daniels for information – 318-336-5315**
**gdaniels@agcenter.lsu.edu**

***Master Farmer Field Day – July 17, 2009***
***Scott Wiggers Farm, Franklin Parish***
***Contact Donna Morgan for information – 318-613-9278***
***dsmorgan@agcenter.lsu.edu***

**Dean Lee Research and Extension Field Day – August 20, 2009**
***Contact Danny Coombs for information – 318-473-6528***
***dcoombs@agcenter.lsu.edu***

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LSU AgCenter Cotton Research and Extension

**Below is a list of contacts, parish and area field agents and state extension specialists. They are prepared to assist you with any questions or problems you have.**

| COTTON FIELD AGENTS | | | |
|---|---|---|---|
| **PARISH** | **AGENT** | **PHONE** | **EMAIL** |
| Avoyelles | Trent Clark<br>Carlos A. Smith Jr | 318-253-7526<br>318-253-7526 | tclark@agcenter.lsu.edu<br>CSmith@agcenter.lsu.edu |
| Bossier | Joe Barrett | 318-965-2326 | JBarrett@agcenter.lsu.edu |
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| Caldwell | Jim McCann | 318-649-2663 | JMcCann@agcenter.lsu.edu |
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| Pointe Coupee | Miles Brashier | 225-638-5533 | MBrashier@agcenter.lsu.edu |
| Rapides | Matt Martin | 318-473-6605 | MMartin@agcenter.lsu.edu |
| Red River | | 318-932-4342 | @agcenter.lsu.edu |
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| St. Landry | Keith Normand | 337-948-0561 | KNormand@agcenter.lsu.edu |
| Tensas | Dennis Burns | 318-766-3222 | dburns@agcenter.lsu.edu |
| West Carroll | Myrl Sistrunk | 318-428-3571 | MSistrunk@agcenter.lsu.edu |
| **EXTENSION SPECIALISTS** | | | |
| Cotton Specialist | Donald Boquet | 318-435-2157<br>318-535-8954(cell) | dboquet@agcenter.lsu.edu |
| Weed Specialists | Bill Williams<br>Daniel Stephenson<br>Donnie Miller | 318-435-2903<br>318-334-3630(cell)<br>318-473-6590<br>318-308-72259(cell)<br>318-766-4607 | bwilliams@agcenter.lsu.edu<br>dstephenson@agcenter.lsu.edu<br>dmiller@agcenter.lsu.edu |
| Entomology Specialist | Roger Leonard | 318-435-2157<br>318-334-0147(cell) | rleonard@agcenter.lsu.edu |
| Nematology Specialist | Charlie Overstreet | 225-578-2186 | Coverstreet@agcenter.lsu.edu |
| Pathology Specialist | Boyd Padgett | 318-435-2157<br>318-614-4354(cell) | bpadgett@agcenter.lsu.edu |
| Economics Specialist | Gene Johnson | 504-388-4081 | GJohnson@agcenter.lsu.edu |
| Soil Fertility Specialist | J. Stevens | 318-427-4408<br>318-308-0754(cell) | JStevens@agcenter.lsu.edu |
| Extension Associate | Brandi Woolam | 318-290-0625(cell) | BWoolam@agcenter.lsu.edu |

**Louisiana State University Center Agricultural Center**, William B. Richardson, Chancellor
**Louisiana Agricultural Experiment Station**, David J. Boethel, Vice-Chancellor and Director
**Louisiana Cooperative Extension Service**, Paul D. Coreil, Vice Chancellor and Director
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