2010 RANDOLPH COUNTY NON-IRRIGATED COTTON VARIETY TEST PLOT

Buster Haddock, University of Georgia Cooperative Extension, Cuthbert, GA
Brian Cresswell, University of Georgia Cooperative Extension, Blakely, GA
Ted Milliron, Randolph County Cotton Producer

Introduction

For several years, DP 555 BR has been the cotton cultivar of choice in Randolph County and the state of Georgia. There were many years that DP 555 BR consisted of well over 90% of the acreage in the county. DP 555 BR was a tall growing, drought tolerant cotton variety with great fruiting potential and longevity. However, in 2008 DP 555 BR began to be phased out of production and this forced cotton producers in Georgia to seek new varieties to plant. Although DP 555 BR was considered superior in yield to all available cultivars, it did not produce the highest quality of fiber. Therefore, yield and fiber quality were the two most sought after characteristics when considering new varieties.

As the situation required an obvious transition to newer varieties, there was sufficient research on varieties in irrigated scenarios, but a considerable void for non-irrigated cotton variety research. Although most of southwest Georgia has ample water to irrigate crops, there are several areas where water is not available and many acres are non-irrigated. The lack of quality, replicated, non-irrigated cotton variety research prompted an effort by several county agents to conduct variety trials to assist producers in the coming years. As part of this desire to meet this need, the Randolph County Extension Office participated in the 2010 Uniform Cotton Variety Performance Evaluation Program, which was established by Dr. Guy Collins and Dr. Jared Whitaker. The objective of this program was to identify the best cultivars to plant in the absence of DP 555 BR and bolster the variety trial research effort across the state.

Materials and Methods

A suitable research plot location and grower, Ted Milliron, were identified for the program in Randolph County. Based on the research protocol provided by Dr. Guy Collins, the ten most likely replacement varieties were selected, acquired, and planting procedures were planned. The ten varieties tested in the non-irrigated cotton plots were: DP 555 BR, DP 0949 B2RF, DP 1048 B2RF, DP 1050 B2RF, FM 1740 B2RF, PHY 375 WRF, PHY 485 WRF, PHY 565 WRF, ST 4288 B2RF, and ST 5458 B2RF.

The test plots were prepared by disking, then trifluralin (1.25 pt/A) was applied and incorporated by disking. The plot area was stripped and planted with the seed being placed about 1” deep. Reflex and Diuron (1 pt/A each) were applied behind the drill with Temik placed in-furrow (4.5 lbs/A). Three replicated plots were designed and initiated in the same manner. Plots were 18’ wide x 1340’ long and approximately one-half acre

each. Although DP 555 BR was not available to be planted beyond 2010, it was included in the test for a valid comparison.

Prior to emergence, paraquat was applied (10 oz/A) to kill any weeds left in the field. About three weeks after planting, Round-up (1qt/A) and Staple (2 oz/A) were applied to all plots. The final herbicide application occurred at layby with Diuron and MSMA (1qt/A each). Weed control in the plots was excellent. A few palmer amaranth survived and were hand pulled. Insect control consisted of Orthene 97 (1/4 lb/A applied @ 3-4 leaf stage for thrips control), Leverage (3 oz/A 2nd week of bloom) and one application of Bidrin (6oz/A for stink bug). One application of mepiquat chloride (12 oz/A) was applied to all plots after first bloom.

The plots received chicken litter (2 tons/A) prior to planting and 28-0-0-5 (60 lbs/A) after first bloom. Two applications of liquid boron (1 pt/A) were also applied after first bloom with herbicides and insecticides. The cotton plots were planted on April 23, 2010. On May 26, 2010 the first squares appeared. The cotton began blooming on June 12, 2010. It has also been assumed that the crop reached cut out around the end of the first week of July. Although we showed no measurable rain in the month of July, it is assumed that we received a small amount around July 4th, 2010. The lack of rain following first bloom was the primary factor in the low yields. Two of the three replications were harvested on September 4, 2010. Prior to harvest, the cotton was treated with Prep (1qt/A) and Dropp (6 oz/A) with a John Deere 6500 High-cycle sprayer because poor yield potential did not justify treating with an airplane. Due to harvesting issues and picker malfunctions, time did not allow for the third replication to be harvested on time and was thus removed from the final results.

Results and Discussion

The purpose of the study was to determine what the best cultivars were for non-irrigated cotton farming. Precipitation was certainly a big factor on the outcome of this research. Very little precipitation occurred and the day-to-day temperatures were the hottest on record (Table 1). As we switched from El Niño to La Niña, we experienced an extreme reduction in precipitation and an increase in temperature. Unfortunately the switch happened early in the growing season and the crop did not really benefit from the early season water as it became dry during the fruiting period. Extreme heat unit accumulation also forced the cotton plots into an early permanent wilt and cut out during the first part of July and thus limited yield. Another factor that created difficulty was the fact that rains were received in early and late August. As the plants were cutting out, new precipitation forced new growth on the plants creating unharvestable bolls that would ultimately never accumulate enough heat units to reach maturity. This resulted in difficulty defoliating and harvesting the plots, as well as, staining some lint.

Table 1 Average temperatures from period of first bloom to cut out (June 12-July 12) at the Georgia Automated Environmental Monitoring Network in Shellman, GA.

June 12-July 12 Period by Year	Average Daily Max Temperature	Average Daily Min Temperature	Average Daily Temperature
2010	95.36 °F	72.63 °F	83.99 °F
2009	94.19 °F	72.26 °F	83.22 °F
2008	91.91 °F	69.02 °F	80.46 °F
2007	92.27 °F	69.96 °F	81.11 °F

As mentioned above, the primary factor in the outcome of this research was the timing of the hydrologic events in relation to the growth stages of the cotton plots. Of the 9.64" of precipitation received and documented in the trial, only 2.00" of the total was received after first bloom. Of the 2" received in the trial following first bloom, the first rain received was two weeks following first bloom was .5". The rest of the remaining 1.5" came a full month following first bloom.

Given the climatic conditions this crop and the trial received, the results in some ways did not reflect some expectations, but promised to be an excellent study in the ability of the ten core varieties to tolerate extreme drought and heat.

Of the three replications we chose to measure the center plot assuming it would be the most uniform as far as conditions were concerned. There were some differences between the mic, strength and color grade of some of the varieties. The lint turnout from the UGA Micro-gin follows in Table 2.

Table 2. Gin results from the 2011 Randolph County non-irrigated cotton variety test plot located on Ted Milliron Farms courtesy of the UGA micro-gin.

Variety	Color Grade	Staple	Mic	Strength	Leaf Grade	% Gin Turnout	HVI Length	Uniformity
DP 555 BR	21	31	5.0	22.9	3	38.28	0.98	77.8
DP 0949 B2RF	21	34	4.2	28.3	3	36.71	1.05	80.5
DP 1048 B2RF	22	33	4.3	26.7	2	37.05	1.03	79.0
DP 1050 B2RF	21	33	4.2	26.7	2	39.74	1.04	80.0
FM 1740 B2RF	21	33	3.3	25.5	3	33.67	1.03	78.0
PHY 375 WRF	21	34	5.1	22.2	3	35.36	1.06	78.5
PHY 485 WRF	32	34	5	24.8	5	32.43	1.05	80.1
PHY 565 WRF	32	34	3.8	29.2	3	35.65	1.05	79.4
ST 4288 B2RF	21	35	3.4	27.6	3	32.92	1.08	80.3
ST 5458 B2RF	22	33	5.2	24.2	3	34.32	1.03	80.5

From the gin turnout, there was a spectrum of results. Compared to historical results, lint percentage was much lower than traditional levels. There is some speculation that during highly stressful growing conditions and drought, that seed size is typically larger and this could be the reason for this phenomenon.

Table 3 is the final yield for the varieties that were tested. This particular trial was one of 16 that included DP 555 BR as a comparison. It is extremely interesting to note that DP 555 BR did not perform well in this particular trial which alludes to the fact that good cotton yields cannot be expected in extreme conditions regardless of the variety or traits.

Table 3 Average yield, 2010 Randolph County non-irrigated cotton variety trial.

Variety	Yield (lbs/A)
ST 4288 B2RF	490
PHY 375 WRF	472
ST 5458 B2RF	452
DP 0949 B2RF	452
DP 1050 B2RF	421
FM 1740 B2RF	389
DP 1048 B2RF	383
DP 555 BR	369
PHY 485 WRF	357
PHY 565 WRF	352
Trial Average	414 lbs/A

The results from this particular trial were certainly subject to extreme growing conditions and we received some unexpected yields. However, we do believe that it will serve as a good example for expected yields for the varieties tested under similar conditions in the future.