Upland Cotton Variety Evaluation in Graham County

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Abstract

A field trial was established during the 2001 growing season as part of the statewide Upland Cotton Variety Testing Program. This trial was located in Thatcher with Dennis Layton Farms as the cooperator. The location was one of eleven around the state. Seven Upland cotton varieties to be evaluated at this location were entered by various cooperating seed companies. A new variety from FiberMax produced the highest yield and also possessed the highest quality fiber making it the variety that would have produced the highest gross income to the producer.

Introduction

Variety selection is one the most important management decisions made by the producer and is a key component to a successful cotton crop. Cotton production in the state of Arizona has a tremendously wide range in environmental and climatic regions. Cotton is produced in regions from just above sea level to over 4,000 feet above sea level. Therefore, proper variety selection for a given region is extremely important. A particular variety that performs well in one region of the state will not necessarily perform well in another region.

The Upland cotton variety testing program provides growers region-specific variety evaluations in a non-biased format. Most tests are located on grower-cooperator fields under normal production practices for that region. Over recent years there has been an increase in the number of available varieties to growers making the decision of variety selection more difficult. With the advent of transgenic varieties, such as Bt and herbicide tolerant technologies, the list of available varieties has grown even further.

Materials and Methods

Seven varieties were selected by the cooperating seed companies and planted in a randomized complete block design with three replications. Plots were eight - 36" rows wide and extended the full length of the irrigation run of 1250 feet. Plant measurements were taken on approximately fourteen-day intervals throughout the growing season. These plant measurements included plant height, number of mainstem nodes, and number of aborted or missing sites. Yield estimates were made by harvesting the entire eight-row plot, for each replication, at the end of the season. Sub-samples were taken from each plot for fiber quality and percent lint estimates. Premiums and discounts from fiber quality were calculated for each variety based upon the CCC loan schedule. Overall value of the crop was also determined by multiplying the yield by the adjusted price based upon fiber quality discounts or premiums.

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Results

Plant measurement results revealed very few differences in plant growth and development over the duration of the season with the exception of the two Stoneville varieties and FM 989BR. These three varieties had reduced plant vigor as indicated in Figure 1 and lower overall fruit retention (Figure 2) at the end of the season. The two Deltapine (DP655BR and DP5690RR) varieties entered into the test had more vigorous growth than the other varieties and produced more mainstem nodes and thus more fruiting sites than the other varieties (Figure 3). The two Deltapine varieties produced more fruiting sites, but because of a higher rate of fruit loss the overall fruit retention was similar to the other varieties. Several varieties performed well with respect to yield at the Graham County site. The varieties tended to fall out into three groupings. The top two varieties (FM 989BR ad DP5690R) were the highest with the next two varieties falling into the second group (DP655BR and PM 1560BR). The two Stoneville varieties (ST4892BR and ST4793R) and the SureGrow variety (SG501BR) fell into the last grouping. The new transgenic variety from FiberMax (FM989BR) performed particularly well with respect to yield, fiber quality, and therefore value. Yield is not always the most important characteristic of a variety to consider. Figure 4 illustrates the fact that the ranking of the varieties with respect to yield is not necessarily the same as their ranking for value.

The results from this variety evaluation would indicate that the standard varieties planted in the upper Gila River valley (DP655BR and DP5690R) are good variety selections. One might also consider the new FiberMax variety (FM989BR) as an alternative to diversify the varieties planted due to its high yielding capabilities and high quality fiber characteristics.

When a decision is made to try a new variety it is important to remember that this variety will likely respond differently to management techniques than other varieties that a grower might have become accustomed to. It would be wise to start out with a smaller acreage of a new variety to learn how the variety responds to a particular management style. It is also important to keep in mind that this is one year's data and that in another year the performance of these varieties may be dramatically different.

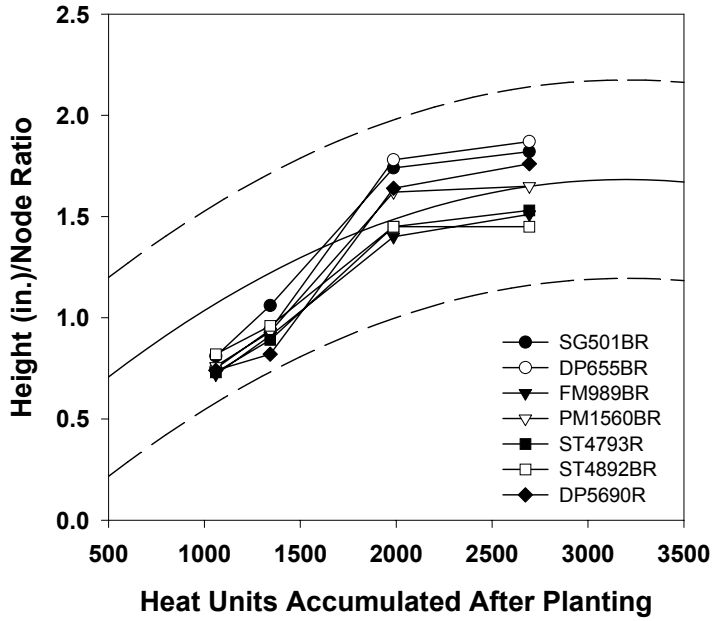

Figure 1. Height (in.) to node ratio for each of the seven varieties planted in Graham County, AZ in 2002.

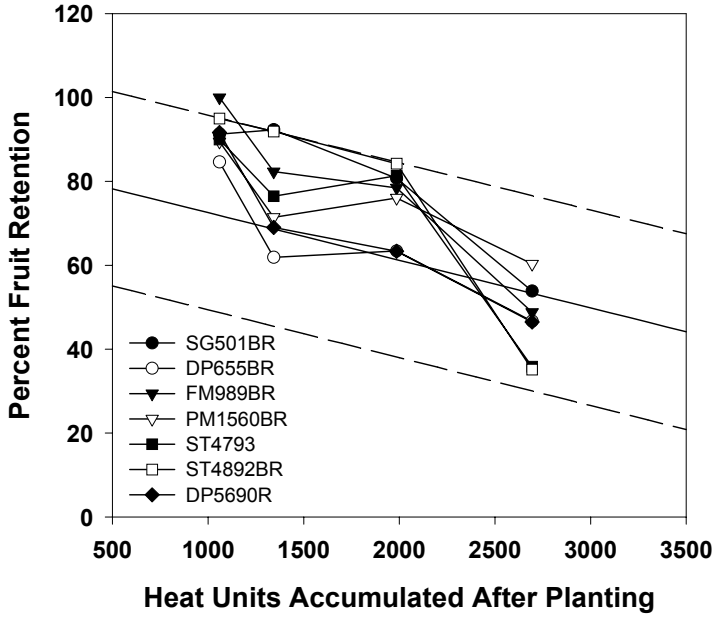

Figure 2. Fruit retention levels for each of the seven varieties planted in Graham County, AZ in 2002.

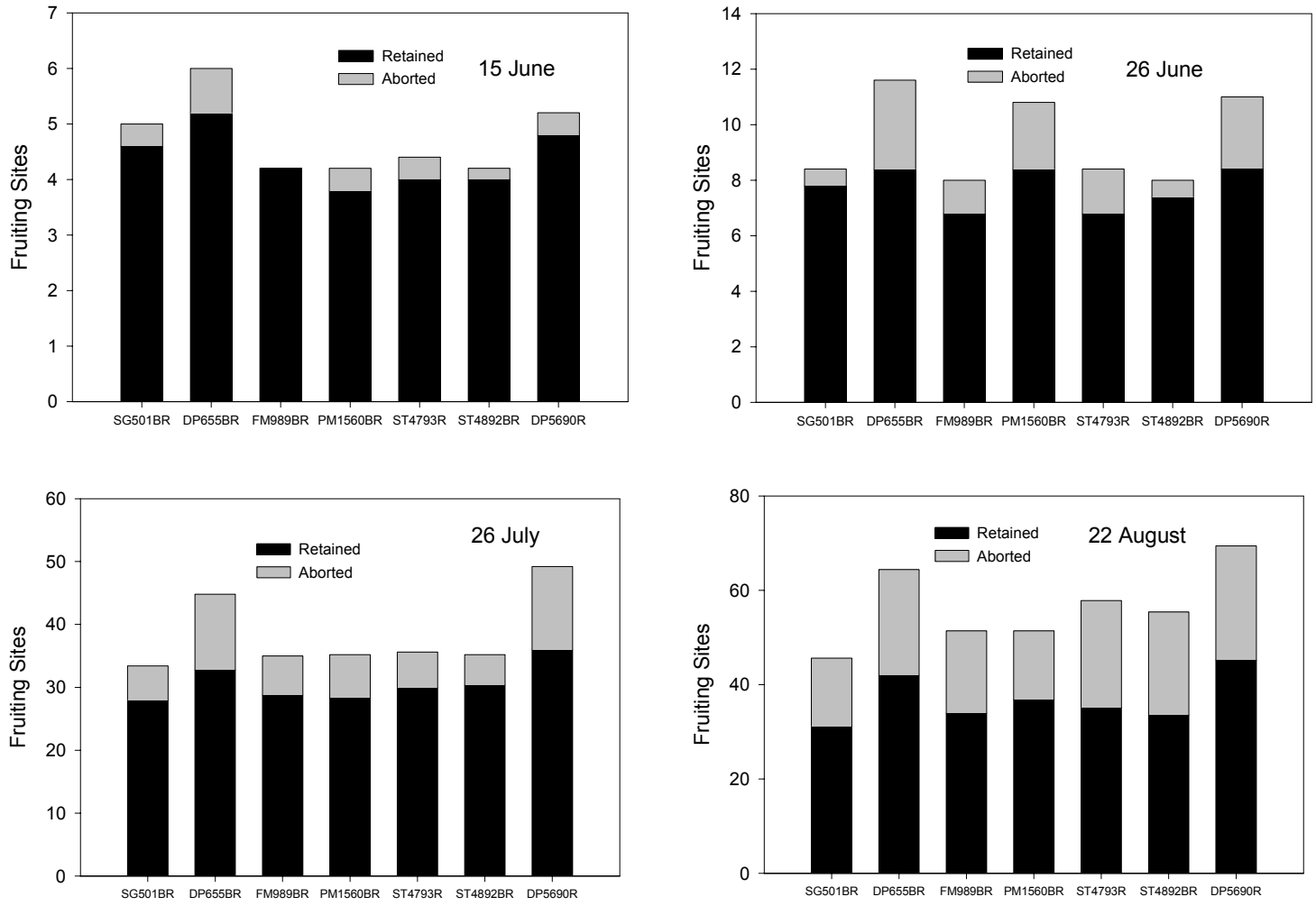

Figure 3. Fruiting node development and retention of fruit for each of the varieties at four sample dates during the season, 2001.

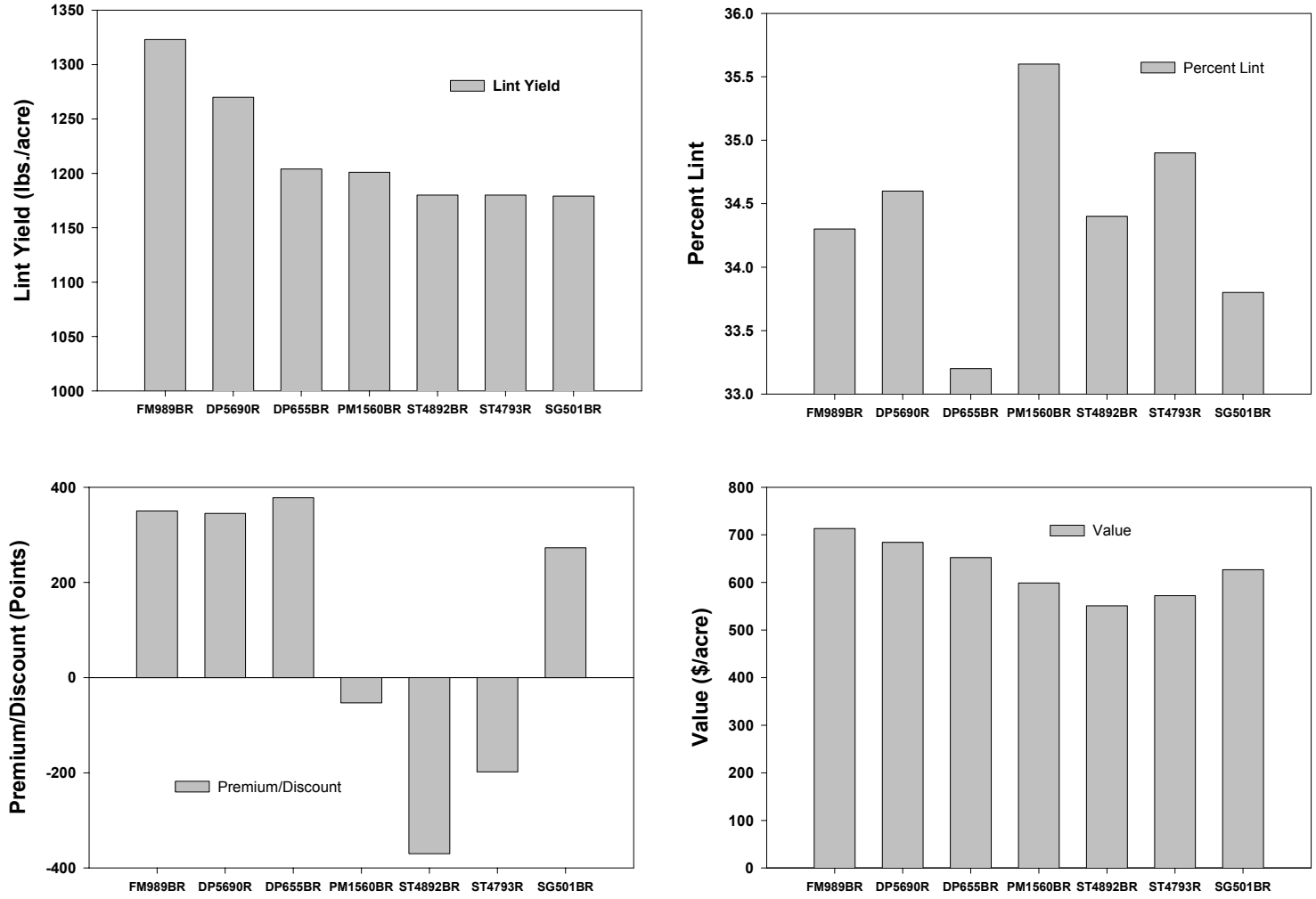

Figure 4. Lint yield, percent lint, premium/discount, and value for each of the seven varieties planted in 2001.

Table 1. Lint yield and fiber quality characteristics for each of the seven varieties planted in 2001.

Company	Variety	Lint Yield (lbs/Acre)	Percent Lint	Fiber Quality						Value[6] ($/acre)
				Micronaire	Fiber Length (100ths)	Staple Length (32nds)	Fiber Strength (g/tex)	Uniformity Index	Premium/ Discount[5] (points)	
Fiber Max	FM989BR	1323 a[1]	34.3 abc	3.9 b	1.12 a	36.0 ab	29.1 ab	80.0	350	713.17
Deltapine	DP5690R	1270 ab	34.6 abc	4.0 b	1.10 ab	35.0 bc	29.4 ab	80.3	345	684.14
Deltapine	DP655BR	1204 bc	33.2 c	3.9 b	1.12 a	36.0 ab	30.4 a	79.3	378	652.30
Deltapine	PM1560BR	1201 bc	35.6 a	3.7 b	1.13 a	36.3 a	28.9 ab	81.0	-53	599.00
Stoneville	ST4892BR	1180 c	34.4 abc	3.8 b	1.08 bc	34.7 cd	26.6 cd	81.0	-370	550.99
Stoneville	ST4793R	1180 c	34.9 ab	4.5 a	1.06 c	33.7 d	25.4 d	80.0	-198	572.29
Deltapine	SG501BR	1179 c	33.8 bc	4.0 b	1.08 bc	34.7 cd	27.8 bc	81.0	273	626.62
$LSD_{0.05}$[2]		74	1.4	0.4	0.03	1.0	1.7	NS	--	--
OSL[3]		0.0066	0.0508	0.0363	0.0008	0.0011	0.0006	0.0778	--	--
CV (%)[4]		3.42	2.23	5.95	1.37	1.64	3.46	0.75	--	--

[1]Means followed by the same letter are not significantly different according to a Fisher's LSD means separation test..
[2]LSD: Least Significant Difference.
[3]OSL: Observed Significance Level.
[4]CV: Coefficient of Variation.
[5]Average premium or discount applied to the lint based on CCC loan schedule.
[6]Value of lint per acre based on CCC loan schedule of discounts and premiums and assuming a base value of 50.40 cents per pou