EVALUATION OF COTTON IN LARGE-PLOT ON-FARM VARIETY TESTING IN ARKANSAS

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Abstract

Unbiased information regarding variety performance is critical in enabling producers to make informed seed buying decisions to increase their productivity and profits. Variety selection is one of the most important decisions a producer makes. Many different cotton varieties and technologies are available to producers today. Variety trials are conducted in Arkansas and provide valuable information on the performance of cotton varieties. The objective of this study was to evaluate growth characteristics, lint yield, and fiber quality of select varieties in large-plot on-farm testing. Each variety has strengths and weaknesses. The challenge is to identify these characteristics and adjust management strategies to enhance strengths while minimizing the weaknesses. Ultimately, the best experience is based on first-hand, on-farm knowledge. Evaluate yield and quality parameters of both university and other local unbiased testing programs to learn more about new varieties.

Introduction

Yield is often the primary selection criteria used for variety selection. When selecting varieties for planting, don't simply choose the top yielding variety at any single testing location or year, but look at the averages of several locations and seasons. Each variety has strengths and weaknesses. The challenge is to identify these characteristics and adjust management strategies to enhance strengths while minimizing the weaknesses. The best experience is based on first-hand, on-farm knowledge. Evaluate yield and quality parameters of unbiased testing programs to learn more about new varieties. Plantings of new varieties should be limited to no more than 10 percent of the farm. Acreage of a variety may be expanded slightly if it performs well the first year. Consider planting the bulk of the farm to three or four proven varieties of differing maturity to reduce the risk of weather interactions and to spread harvest timings.

Materials and Methods

Replicated strips were planted the length of the field and managed according to the remainder of the field in which the study was located. Clay county location a large block variety trial where a full sized module of each variety was harvested, ginned, and marketed separately for each variety. Two varieties chosen by the seed company were entered for this study: Bayer, Americot, Monsanto, Dow, and CPS. The study was harvested with the producer's equipment. Grab samples were collected for lint fraction and fiber quality with the exception of Clay county which were ginned in a commercial gin.

Results and Discussion

On-farm plots were established at 10 locations with a wide range of planting and harvest dates (Table 1). Full season COTMAN indicated no unexpected stress at any of the 8 locations. NAWF data was recorded for all varieties at the selected locations to calculate days to cutout (Table 2). End of season rating such as plant height, canopy closure and a visual ratings were recorded at or just prior to defoliation (Table 3). Lint yield was summarized across locations containing all technologies and across all locations comparing both 2 gene Bt and 3 gene Bt technologies (Table 4-6).

Table 1. Location details for 2018 county large-plot testing program.

	Ashley County	Clay County	Craighead County	Jefferson County	Lee County	Lonoke County	Mississippi Basset	Mississippi County	Poinsett County	St. Francis County
Planted	5/10/2018	5/3/2018	5/7/2018	5/8/2018	5/7/2018	5/11/2018	5/10/2018	5/16/2018	5/2/2018	5/6/2018
Harvested	11/2/2018	10/9/2018	10/30/2018	11/21/2018	10/29/2018	11/3/2018	10/29/2018	10/30/2018	10/3/2018	10/29/2018

Table 2. COTMAN – Days from Planting to Cutout (NAWF=5)

Variety	Ashley County	Craighead County	Jefferson County	Lee County	Lonoke County	Mississippi County	Poinsett County	St. Francis County
	Days	Days	Days	Days	Days	Days	Days	Days
CPS 18827					83			
DG 3214 B2XF	81	82	69	78	85	72	81	70
DG 3385 B2XF	65	74	69	74	88	70	80	69
DG 3433 B2XF					82			
DP 1518 B2XF	81	79	69	78	86	70	82	73
DP 1614 B2XF						72		
DP 1646 B2XF	70	79	75	79	99	67	80	71
DP 1725 B2XF					84			
DP 1820 B3XF	75	82	69	79	84	69	81	74
NG 3729 B2XF	63	75	67	71	83	73	81	65
NG 5007 B2XF	64	81	66	73	83	73	81	70
PHY 320 W3FE		74						
PHY 330 W3FE		79				69	74	66
PHY 350 W3FE	78		66	78	84			
PHY 430 W3FE	75	77	76	75	83	68	85	72
ST 5122 GLT	*	83	61	67	83	71	66	70
ST 5471 GLTP	*	69	61	69	85	72	77	69

Table 3. End of Season Ratings

Variety Name	Ashley County	Craighead County	Jefferson County	Lee County	Lonoke County	Mississippi County	Poinsett County	St. Francis County
	Open Boll (%)	Open Boll (%)	Open Boll (%)	Open Boll (%)	Open Boll (%)	Open Boll (%)	Open Boll (%)	Open Boll (%)
CPS 18827					49			
DG 3214 B2XF	93	30	88	60	50	75	58	85
DG 3385 B2XF	75	70	95	75	30	68	44	80
DG 3433 B2XF					44			
DP 1518 B2XF	82	60	75	68	52	50	41	65
DP 1614 B2XF						76		
DP 1646 B2XF	65	57	67	70	38	62	28	60
DP 1725 B2XF					43			
DP 1820 B3XF	78	44	90	55	55	72	45	90
NG 3729 B2XF	75	68	95	70	58	60	38	85
NG 5007 B2XF	57	40	90	54	50	50	34	88
PHY 320 W3FE		40						
PHY 330 W3FE		42				55		
PHY 350 W3FE	65		93	68	65		45	97
PHY 430 W3FE	78	75	70	65	45	60	48	90
ST 5122 GLT	75	65	85	75	48	78	44	75
ST 5471 GLTP	67	40	78	70	40	60	38	72

Table 4. Lint Yield All Technologies

Variety Name	Ashley County		Clay County		Craighead County		Jefferson County		Lee County		Lonoke County		Mississippi Basset		Mississippi County		Poinsett County		St. Francis County		Average Rank	
	Lint lb/A	R	Lint lb/A	R	Lint lb/A	R	Lint lb/ A	R	Lint lb/A	R	Lint lb/A	R	Lint lb/A	R	Lint lb/A	R	Lint lb/A	R	Lint lb/A	R	Lint lb/A	R
DP 1646 B2XF	1378	1	1473	5	1885	1	2038	1	1385	1	1206	1	1701	5	1739	6	1781	1	2002	1	1659	2.3
ST 5471 GLTP	1188	6	1606	1	1825	3	1784	2	1377	2	1087	2	1975	1	1837	2	1652	2	1872	3	1620	2.4
ST 5122 GLT	1102	9	1362	6	1786	5	1730	3	1385	1	1058	3	1858	2	1791	5	1558	4	1976	2	1561	4.0
NG 3729 B2XF	1221	3	1567	2	1751	7	1658	6	1299	5	969	9	1569	7	1855	1	1463	7	1754	4	1511	5.1
DG 3385 B2XF	1271	2	1565	3	1843	2	1662	5	1325	3	1043	4	1426	10	1644	10	1507	5	1619	10	1491	5.4
DP 1820 B3XF	1126	8			1710	9	1652	7	1104	10	1004	5	1747	3	1832	3	1447	8	1742	5	1485	6.4
DG 3214 B2XF	1205	4	1497	4	1681	10	1572	11	1195	8	970	8	1373	11	1817	4	1575	3	1680	8	1457	7.1
NG 5007 B2XF	1193	5	1357	7	1713	8	1684	4	1255	6	1000	6	1472	9	1701	7	1339	11	1167	11	1384	7.4
PHY 430 W3FE	1092	11			1800	4	1639	9	1192	9	978	7	1716	4	1670	8	1349	10	1701	6	1460	7.6
DP 1518 B2XF	1096	10			1758	6	1584	10	1316	4	861	11	1436	8	1651	9	1488	6	1684	7	1430	7.9
PHY 350 W3FE	1142	7					1649	8	1201	7	914	10									1227	8.0
PHY 330 W3FE					1533	11							1682	6	1496	11	1365	9	1674	9	1550	9.2

Table 5. Lint Yield 2 Gene Bt Technologies

Variety Name	Ashley County		Clay County		Craighead County		Jefferson County		Lee County		Lonoke County		Mississippi Basset		Mississippi County		Poinsett County		St. Francis County		Average Rank	
	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R.	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R
DP 1646 B2XF	1378	1	1473	5	1885	1	2038	1	1385	1	1206	1	1701	5	1739	6	1781	1	2002	1	1659	2.3
ST 5122 GLT	1102	9	1362	6	1786	5	1730	3	1385	1	1058	3	1858	2	1791	5	1558	4	1976	2	1561	4.0
NG 3729 B2XF	1221	3	1567	2	1751	7	1658	6	1299	5	969	9	1569	7	1855	1	1463	7	1754	4	1511	5.1
DG 3385 B2XF	1271	2	1565	3	1843	2	1662	5	1325	3	1043	4	1426	10	1644	10	1507	5	1619	10	1491	5.4
DG 3214 B2XF	1205	4	1497	4	1681	10	1572	11	1195	8	970	8	1373	11	1817	4	1575	3	1680	8	1457	7.1
NG 5007 B2XF	1193	5	1357	7	1713	8	1684	4	1255	6	1000	6	1427	9	1701	7	1339	11	1167	11	1384	7.4
DP 1518 B2XF	1096	10			1758	6	1584	10	1316	4	861	11	1436	8	1651	9	1488	6	1684	7	1430	7.9

Table 6. Lint Yield 3 Gene Bt Technologies

Variety Name	Ashley County		Clay County		Craighead County		Jefferson County		Lee County		Lonoke County		Mississippi Basset		Mississippi County		Poinsett County		St. Francis County		Average Rank	
	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R	Lint (lb/A)	R
ST 5471 GLTP	1188	6	1606	1	1825	3	1784	2	1377	2	1087	2	1975	1	1837	2	1652	2	1872	3	1620	2.4
DP 1820 B3XF	1126	8			1710	9	1652	7	1104	10	1004	5	1747	3	1832	3	1447	8	1742	5	1485	6.4
PHY 430 W3FE	1092	11			1800	4	1639	9	1192	9	978	7	1716	4	1670	8	1349	10	1701	6	1460	7.6
PHY 350 W3FE	1142	7					1649	8	1201	7	914	10									1227	8.0
PHY 330 W3FE					1533	11							1682	6	1496	11	1365	9	1674	9	1550	9.2

Summary

Relative differences were apparent between varieties in maturity as measured by percent open bolls. While lint yield differences were observed, it is important to remember that the varieties tested are a subset of the top performing commercially available varieties.