END OF SEASON FRUIT RETENTION, YIELD, AND FIBER QUALITY OF TEXAS COTTON CULTIVARS

David R. Drake
Texas A&M AgriLife Extension Service
Commerce, TX

Introduction and Abstract

Upland cotton grown in Texas is a tropical perennial plant grown in a temperate environment. Cotton producers must choose between varieties of various maturities and fruiting habits. Producers also must determine when to terminate the cotton crop for harvest before winter weather kills the plants and may impede harvest. In San Angelo, the central rolling plains of Texas, September through November are typically warm and dry and producers tend to wait as long as possible before harvest to achieve higher yields. Delaying harvest does present risks of lower quality immature fiber and stained or contaminated fiber from wet winter weather and poor harvest conditions. To monitor varieties, late season yield, and fiber quality; first position white blooms were tagged the last week of August and then approximately one week later in September. Tags and resulting bolls were removed prior to harvest in October. Individual bolls were weighed and fiber was sent for analysis by HVI. In 2016, 42 commercial and experimental strains were evaluated in a replicated dryland trial near San Angelo, TX; with bolls tagged on August 31st and Sept 6th. The average percent of blooms that developed into harvestable bolls was 38.4 and 23.5 for August 31st and Sept. 6th respectively. The average boll weight was also about 75 percent of the average boll weight for these late blooms compared to earlier first position bolls. Varieties differ in retention, boll size, and overall yield. The total yield of a variety does not correlate with this late season fruit production.

Materials and Methods

First position white blooms were tagged with a strung paper tag on August 31 and September 6 of 2016. Two tags were placed per plot for each plot of the 4 replications. Tags and bolls were collected and weighed. Blooms that fell off or did not mature were marked with a 0. To determine average boll size 25 first position bolls were hand picked and the seed cotton weighted.

Results and Discussion

The average retention of blooms that developed into harvestable bolls was only 38.4 percent for those tagged on August 31, 2016 and 23.5 percent for those tagged on Sept. 6, 2016. Although the August date had a higher percentage of retained bolls 6 entries did not produce any harvestable bolls. Interestingly 3 of those entries produced harvestable bolls from Sept 6 tagged blooms. Eight entries did not produce any harvestable bolls from September 6th tagged blooms and three entries did not produce harvestable bolls on either date.

When comparing the average boll size with the later season bolls, later season bolls were mostly were lower in weight. The two tagging dates were close to 75 percent of the average weight with a few bolls of equal size on both tagging dates. A later season rain event may have benefited the Sept 6th tagging date.
Fiber quality results are not presented and are expected to be lower quality.

Table 1. Dryland evaluation of 42 cotton varieties and experimental strains near San Angelo, TX in 2016. Sorted by fiber yield highest to lowest.

	Lint	lint	Yield	ave. 1°	1° blooms tagged on Aug 1st			1° blooms tagged on Sept. 6th 2016		
entry	Yield	turnout	Rank	boll wt (g)	% fruit set	boll wt (g)	% of earlier bolls	% fruit set	boll wt (g)	% of earlier bolls
PHY 499 WRF	965.9	0.303	1	4.510	16.7	3.81	84.4	16.7	3.82	84.6
PHY 496 W3RF	934.5	0.310	2	4.550	12.5	4.07	89.4	0		
DP 1549 B2XF	909.6	0.289	3	4.470	50	1.73	38.8	33.3	3.5	78.3
PHY 444 WRF	901.1	0.314	4	5.020	37.5	2.94	58.6	0		
DG 3635 B2XF	871.8	0.305	5	3.850	100	3.02	78.3	83.3	2.69	69.7
CPS 13014-4V RF	863.3	0.326	6	4.190	33.3	4.01	95.8	16.7	3.29	78.6
FM 2334 GLT	856.6	0.314	7	4.480	66.7	3.84	85.6	50	2.15	48
DP 1219 B2RF	848.3	0.298	8	4.540	33.3	2.88	63.4	33.3	2.83	62.2
PHY 417 WRF	843.6	0.300	9	4.520	33.3	3.88	85.7	16.7	3.45	76.3
FM 1830 GLT	837.4	0.318	10	4.910	50	4.91	50.2	33.3	2.72	55.5
CPS 16654 B2XF	829.8	0.320	11	5.150	25	3.04	59.1	25	3.13	60.8
DP 1646 B2XF	825.2	0.347	12	4.800	33.3	4.66	97.1	33.3	3.63	75.7
ST 5115 GLT	822.8	0.285	13	5.290	0			0		
DG 3544 B2XF	820.5	0.294	14	5.200	66.7	4.58	88.2	33.3	2.92	56.2
DG 2615 B2RF	814.1	0.294	15	4.550	100	2.14	47	50	3.3	72.5
PHY 490 W3FE	807.7	0.298	16	4.360	37.5	3.55	81.5	25	3.36	77
PHY 312 WRF	796.8	0.278	17	4.690	25	4.55	97.1	12.5	3.35	71.5
PHY 333 WRF	796.6	0.312	18	4.410	50	4.58	104	33.3	3.76	85.3
NG 4545 B2XF	782.1	0.286	19	4.770	0			25	3.59	75.6
ATX Concho B2XF	776.0	0.270	20	5.970	66.7	3.83	64.2	50	5.73	96
NG 3522 B2XF	773.6	0.280	21	4.730	0			0		
ST 4747 GLB2	771.1	0.274	22	4.710	0			37.5	3.05	64.7
DG 3385 B2XF	769.2	0.299	23	4.230	0			0		
DG 3445 B2XF	756.4	0.275	24	5.190	50	3.4	65.5	16.7	4.2	80.9
ST 4946 GLB2	756.3	0.287	25	4.430	16.7	3.75	84.7	33.3	4.49	101
CSCG 3885 B2XF	752.0	0.310	26	4.080	83.3	2.59	63.6	16.7	3.02	74.1
BX 1733 GLT	751.3	0.288	27	4.580	50	3.58	78.3	25	2.79	61
ST 4949 GLT	738.4	0.279	28	4.400	66.7	3.94	89.6	16.7	3.92	89.2
FM 1911 GLT	737.9	0.295	29	4.890	33.3	3.98	81.4	50	4.77	97.5
FM 1900 GLT	729.0	0.264	30	5.080	0			33.3	4.82	94.8
BX 1739 GLT	727.0	0.290	31	4.380	50	2.42	55.2	33.3	1.9	43.4
AMX 1601 B2XF	724.2	0.300	32	4.460	66.7	2.38	53.3	33.3	4.46	51.3
PHY 764 WRF ACALA	721.7	0.267	33	4.550	37.5	3.01	66.1	25	4.1	89.8
NG 1511 B2RF	718.0	0.272	34	4.110	25	4.47	109	12.5	4.39	107
ST 4848 GLT	710.6	0.272	35	3.900	33.3	3	76.9	16.7	3.64	93.3
DP 1522 B2XF	708.8	0.292	36	4.320	50	2.52	58.2	0		
FM 9180 B2F	705.1	0.262	37	5.120	12.5	5.07	99	12.5	4.95	96.7
NG 5007 B2XF	701.3	0.301	38	4.070	50	3.36	82.5	16.7	4.31	106
FM 2007 GLT	699.7	0.284	39	4.690	12.5	2.71	57.7	0		
ATX EPIC RF	692.9	0.286	40	5.670	50	3.66	64.5	12.5	4.61	81.2
DP 1044 B2RF	688.6	0.257	41	3.990	75	2.2	55.1	25	1.05	26.3
NG 3406 B2XF	661.8	0.268	42	4.310	12.5	2.8	64.9	0		
Average	783.2949	0.291		4.622	38.393	3.468	74.275	23.510	3.579	75.941
P>(F)6	0.05	0.0001								
LSD (P=0.05)	175	0.023								
CV %	13.1	3.64								

Table 2. Dryland evaluation of 42 cotton varieties and experimental strains near San Angelo, TX in 2016. Sorted by percentage of retained fruit from blooms tagged on August 31st

	Lint	lint	Yield	ave. 1°	1° blooms tagged on Aug 1st			1° blooms tagged on Sept. 6th 2016		
entry	Yield	turnout	Rank	boll wt (g)	% fruit set	boll wt (g)	% of earlier bolls	% fruit set	boll wt (g)	% of earlier bolls
DG 3635 B2XF	871.8	0.305	5	3.850	100	3.02	78.3	83.3	2.69	69.7
DG 2615 B2RF	814.1	0.294	15	4.550	100	2.14	47	50	3.3	72.5
CSCG 3885 B2XF	752.0	0.310	26	4.080	83.3	2.59	63.6	16.7	3.02	74.1
DP 1044 B2RF	688.6	0.257	41	3.990	75	2.2	55.1	25	1.05	26.3
ATX Concho B2XF	776.0	0.270	20	5.970	66.7	3.83	64.2	50	5.73	96
FM 2334 GLT	856.6	0.314	7	4.480	66.7	3.84	85.6	50	2.15	48
AMX 1601 B2XF	724.2	0.300	32	4.460	66.7	2.38	53.3	33.3	4.46	51.3
DG 3544 B2XF	820.5	0.294	14	5.200	66.7	4.58	88.2	33.3	2.92	56.2
ST 4949 GLT	738.4	0.279	28	4.400	66.7	3.94	89.6	16.7	3.92	89.2
BX 1739 GLT	727.0	0.290	31	4.380	50	2.42	55.2	33.3	1.9	43.4
PHY 333 WRF	796.6	0.312	18	4.410	50	4.58	104	33.3	3.76	85.3
FM 1830 GLT	837.4	0.318	10	4.910	50	4.91	50.2	33.3	2.72	55.5
DP 1549 B2XF	909.6	0.289	3	4.470	50	1.73	38.8	33.3	3.5	78.3
BX 1733 GLT	751.3	0.288	27	4.580	50	3.58	78.3	25	2.79	61
NG 5007 B2XF	701.3	0.301	38	4.070	50	3.36	82.5	16.7	4.31	106
DG 3445 B2XF	756.4	0.275	24	5.190	50	3.4	65.5	16.7	4.2	80.9
ATX EPIC RF	692.9	0.286	40	5.670	50	3.66	64.5	12.5	4.61	81.2
DP 1522 B2XF	708.8	0.292	36	4.320	50	2.52	58.2	0		
PHY 764 WRF ACALA	721.7	0.267	33	4.550	37.5	3.01	66.1	25	4.1	89.8
PHY 490 W3FE	807.7	0.298	16	4.360	37.5	3.55	81.5	25	3.36	77
PHY 444 WRF	901.1	0.314	4	5.020	37.5	2.94	58.6	0		
FM 1911 GLT	737.9	0.295	29	4.890	33.3	3.98	81.4	50	4.77	97.5
DP 1646 B2XF	825.2	0.347	12	4.800	33.3	4.66	97.1	33.3	3.63	75.7
DP 1219 B2RF	848.3	0.298	8	4.540	33.3	2.88	63.4	33.3	2.83	62.2
ST 4848 GLT	710.6	0.272	35	3.900	33.3	3	76.9	16.7	3.64	93.3
PHY 417 WRF	843.6	0.300	9	4.520	33.3	3.88	85.7	16.7	3.45	76.3
CPS 13014-4V RF	863.3	0.326	6	4.190	33.3	4.01	95.8	16.7	3.29	78.6
CPS 16654 B2XF	829.8	0.320	11	5.150	25	3.04	59.1	25	3.13	60.8
NG 1511 B2RF	718.0	0.272	34	4.110	25	4.47	109	12.5	4.39	107
PHY 312 WRF	796.8	0.278	17	4.690	25	4.55	97.1	12.5	3.35	71.5
ST 4946 GLB2	756.3	0.287	25	4.430	16.7	3.75	84.7	33.3	4.49	101
PHY 499 WRF	965.9	0.303	1	4.510	16.7	3.81	84.4	16.7	3.82	84.6
FM 9180 B2F	705.1	0.262	37	5.120	12.5	5.07	99	12.5	4.95	96.7
NG 3406 B2XF	661.8	0.268	42	4.310	12.5	2.8	64.9	0		
FM 2007 GLT	699.7	0.284	39	4.690	12.5	2.71	57.7	0		
PHY 496 W3RF	934.5	0.310	2	4.550	12.5	4.07	89.4	0		
ST 4747 GLB2	771.1	0.274	22	4.710	0			37.5	3.05	64.7
FM 1900 GLT	729.0	0.264	30	5.080	0			33.3	4.82	94.8
NG 4545 B2XF	782.1	0.286	19	4.770	0			25	3.59	75.6
DG 3385 B2XF	769.2	0.299	23	4.230	0			0		
NG 3522 B2XF	773.6	0.280	21	4.730	0			0		
ST 5115 GLT	822.8	0.285	13	5.290	0			0		
Average	783.2949	0.292	-	4.622	38.393	3.468	74.275	23.510	3.579	75.941
P>(F)6	0.05	0.0001								
LSD (P=0.05)	175	0.023								
CV %	13.1	3.64								

Table 3. Dryland evaluation of 42 cotton varieties and experimental strains near San Angelo, TX in 2016. Sorted by percentage of retained fruit from blooms tagged on Sept. 6th.

	Lint	lint	Yield	ave. 1°	1° blooms tagged on Aug 1st			1° blooms tagged on Sept. 6th 2016		
entry	Yield	turnout	Rank	boll wt (g)	% fruit set	boll wt (g)	% of earlier bolls	% fruit set	boll wt (g)	of earlier bo
DG 3635 B2XF	871.8	0.305	5	3.850	100	3.02	78.3	83.3	2.69	69.7
DG 2615 B2RF	814.1	0.294	15	4.550	100	2.14	47	50	3.3	72.5
ATX Concho B2XF	776.0	0.270	20	5.970	66.7	3.83	64.2	50	5.73	96
FM 2334 GLT	856.6	0.314	7	4.480	66.7	3.84	85.6	50	2.15	48
FM 1911 GLT	737.9	0.295	29	4.890	33.3	3.98	81.4	50	4.77	97.5
ST 4747 GLB2	771.1	0.274	22	4.710	0			37.5	3.05	64.7
AMX 1601 B2XF	724.2	0.300	32	4.460	66.7	2.38	53.3	33.3	4.46	51.3
DG 3544 B2XF	820.5	0.294	14	5.200	66.7	4.58	88.2	33.3	2.92	56.2
BX 1739 GLT	727.0	0.290	31	4.380	50	2.42	55.2	33.3	1.9	43.4
PHY 333 WRF	796.6	0.312	18	4.410	50	4.58	104	33.3	3.76	85.3
FM 1830 GLT	837.4	0.318	10	4.910	50	4.91	50.2	33.3	2.72	55.5
DP 1549 B2XF	909.6	0.289	3	4.470	50	1.73	38.8	33.3	3.5	78.3
DP 1646 B2XF	825.2	0.347	12	4.800	33.3	4.66	97.1	33.3	3.63	75.7
DP 1219 B2RF	848.3	0.298	8	4.540	33.3	2.88	63.4	33.3	2.83	62.2
ST 4946 GLB2	756.3	0.287	25	4.430	16.7	3.75	84.7	33.3	4.49	101
FM 1900 GLT	729.0	0.264	30	5.080	0			33.3	4.82	94.8
DP 1044 B2RF	688.6	0.257	41	3.990	75	2.2	55.1	25	1.05	26.3
BX 1733 GLT	751.3	0.288	27	4.580	50	3.58	78.3	25	2.79	61
PHY 764 WRF ACALA	721.7	0.267	33	4.550	37.5	3.01	66.1	25	4.1	89.8
PHY 490 W3FE	807.7	0.298	16	4.360	37.5	3.55	81.5	25	3.36	77
CPS 16654 B2XF	829.8	0.320	11	5.150	25	3.04	59.1	25	3.13	60.8
NG 4545 B2XF	782.1	0.286	19	4.770	0			25	3.59	75.6
CSCG 3885 B2XF	752.0	0.310	26	4.080	83.3	2.59	63.6	16.7	3.02	74.1
ST 4949 GLT	738.4	0.279	28	4.400	66.7	3.94	89.6	16.7	3.92	89.2
NG 5007 B2XF	701.3	0.301	38	4.070	50	3.36	82.5	16.7	4.31	106
DG 3445 B2XF	756.4	0.275	24	5.190	50	3.4	65.5	16.7	4.2	80.9
ST 4848 GLT	710.6	0.272	35	3.900	33.3	3	76.9	16.7	3.64	93.3
PHY 417 WRF	843.6	0.300	9	4.520	33.3	3.88	85.7	16.7	3.45	76.3
CPS 13014-4V RF	863.3	0.326	6	4.190	33.3	4.01	95.8	16.7	3.29	78.6
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NG 1511 B2RF	718.0	0.272	34	4.110	25	4.47	109	12.5	4.39	107
PHY 312 WRF	796.8	0.278	17	4.690	25	4.55	97.1	12.5	3.35	71.5
FM 9180 B2F	705.1	0.262	37	5.120	12.5	5.07	99	12.5	4.95	96.7
DP 1522 B2XF	708.8	0.292	36	4.320	50	2.52	58.2	0		
PHY 444 WRF	901.1	0.314	4	5.020	37.5	2.94	58.6	0		
NG 3406 B2XF	661.8	0.268	42	4.310	12.5	2.8	64.9	0		
FM 2007 GLT	699.7	0.284	39	4.690	12.5	2.71	57.7	0		
PHY 496 W3RF	934.5	0.310	2	4.550	12.5	4.07	89.4	0		
DG 3385 B2XF	769.2	0.299	23	4.230	0			0		
NG 3522 B2XF	773.6	0.280	21	4.730	0			0		
ST 5115 GLT	822.8	0.285	13	5.290	0			0		
Average	783.2949	0.292		4.622	38.393	3.468	74.275	23.510	3.579	75.941
P>(F)6	0.05	0.0001								
LSD (P=0.05)	175	0.023								
CV %	13.1	3.64								

Table 4. Dryland evaluation of 42 cotton varieties and experimental strains near San Angelo, TX in 2016. Sorted by percentage of average boll weight from blooms tagged on August 31st 2016.

	Lint	lint	Yield	ave. 1°	1° blooms tagged on Aug 1st			1° blooms tagged on Sept. 6th 2016		
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PHY 333 WRF	796.6	0.312	18	4.410	50	4.58	104	33.3	3.76	85.3
FM 9180 B2F	705.1	0.262	37	5.120	12.5	5.07	99	12.5	4.95	96.7
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ST 4949 GLT	738.4	0.279	28	4.400	66.7	3.94	89.6	16.7	3.92	89.2
PHY 496 W3RF	934.5	0.310	2	4.550	12.5	4.07	89.4	0		
DG 3544 B2XF	820.5	0.294	14	5.200	66.7	4.58	88.2	33.3	2.92	56.2
PHY 417 WRF	843.6	0.300	9	4.520	33.3	3.88	85.7	16.7	3.45	76.3
FM 2334 GLT	856.6	0.314	7	4.480	66.7	3.84	85.6	50	2.15	48
ST 4946 GLB2	756.3	0.287	25	4.430	16.7	3.75	84.7	33.3	4.49	101
PHY 499 WRF	965.9	0.303	1	4.510	16.7	3.81	84.4	16.7	3.82	84.6
NG 5007 B2XF	701.3	0.301	38	4.070	50	3.36	82.5	16.7	4.31	106
PHY 490 W3FE	807.7	0.298	16	4.360	37.5	3.55	81.5	25	3.36	77
FM 1911 GLT	737.9	0.295	29	4.890	33.3	3.98	81.4	50	4.77	97.5
DG 3635 B2XF	871.8	0.305	5	3.850	100	3.02	78.3	83.3	2.69	69.7
BX 1733 GLT	751.3	0.288	27	4.580	50	3.58	78.3	25	2.79	61
ST 4848 GLT	710.6	0.272	35	3.900	33.3	3	76.9	16.7	3.64	93.3
PHY 764 WRF ACALA	721.7	0.267	33	4.550	37.5	3.01	66.1	25	4.1	89.8
DG 3445 B2XF	756.4	0.275	24	5.190	50	3.4	65.5	16.7	4.2	80.9
NG 3406 B2XF	661.8	0.268	42	4.310	12.5	2.8	64.9	0		
ATX EPIC RF	692.9	0.286	40	5.670	50	3.66	64.5	12.5	4.61	81.2
ATX Concho B2XF	776.0	0.270	20	5.970	66.7	3.83	64.2	50	5.73	96
CSCG 3885 B2XF	752.0	0.310	26	4.080	83.3	2.59	63.6	16.7	3.02	74.1
DP 1219 B2RF	848.3	0.298	8	4.540	33.3	2.88	63.4	33.3	2.83	62.2
CPS 16654 B2XF	829.8	0.320	11	5.150	25	3.04	59.1	25	3.13	60.8
PHY 444 WRF	901.1	0.314	4	5.020	37.5	2.94	58.6	0		
DP 1522 B2XF	708.8	0.292	36	4.320	50	2.52	58.2	0		
FM 2007 GLT	699.7	0.284	39	4.690	12.5	2.71	57.7	0		
BX 1739 GLT	727.0	0.290	31	4.380	50	2.42	55.2	33.3	1.9	43.4
DP 1044 B2RF	688.6	0.257	41	3.990	75	2.2	55.1	25	1.05	26.3
AMX 1601 B2XF	724.2	0.300	32	4.460	66.7	2.38	53.3	33.3	4.46	51.3
FM 1830 GLT	837.4	0.318	10	4.910	50	4.91	50.2	33.3	2.72	55.5
DG 2615 B2RF	814.1	0.294	15	4.550	100	2.14	47	50	3.3	72.5
DP 1549 B2XF	909.6	0.289	3	4.470	50	1.73	38.8	33.3	3.5	78.3
FM 1900 GLT	729.0	0.264	30	5.080	0			33.3	4.82	94.8
NG 4545 B2XF	782.1	0.286	19	4.770	0			25	3.59	75.6
ST 4747 GLB2	771.1	0.274	22	4.710	0			37.5	3.05	64.7
DG 3385 B2XF	769.2	0.299	23	4.230	0			0		
NG 3522 B2XF	773.6	0.280	21	4.730	0			0		
ST 5115 GLT	822.8	0.285	13	5.290	0			0		
Average	783.2949	0.292		4.622	38.393	3.468	74.275	23.510	3.579	75.941
P>(F)6	0.05	0.0001								
LSD (P=0.05)	175	0.023								
CV %	13.1	3.64								

Conclusions

- There are differences in variety for fruit retention and boll size.
- Late season boll retention does not appear to correlate with overall yield
- This information may be helpful in determining which varieties to harvest timely and which that may benefit from later harvest.

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