2015 Texas High Plains Cotton Variety Trials

Dr. Seth Byrd, Extension Cotton Agronomist
Dr. Mark Kelly, Former Extension Cotton Agronomist
Kristie Keys, Extension Assistant
Cristen Brooks, Floyd County Agent
Joshua Brooks, Hall County Agent
Robert Ferguson, Mitchell County Agent
Graham Henley, Lamb County Agent
Caitlin Jackson, Crosby County Agent
Gary Roschetzky, Dawson County Agent
Wes Utley, Hockley County Agent

Acknowledgements
We would like to express our appreciation to the cooperators that provided their land, time, and equipment to plant, maintain, and harvest these trials. We would also like to thank the Texas State Support Committee, Cotton Incorporated, and the Plains Cotton Improvement Program for funding these trials, as well as Americot/NexGen, Bayer CropScience, Croplan Genetics, Deltapine, and PhytoGen for their partial support of the trials.

Introduction

A vast array of commercial cotton variety options has created a need for evaluations of the performance of varieties in large-scale on-farm scenarios. These trials can aid in determining variety performance under real-world conditions and various environments, and can be used as a source of information regarding variety selection for producers. The objective of this study was to determine performance of multiple commercially-available cotton varieties at on-farm locations across the Texas High Plains region. Three or four replications of 4 to 10 varieties were utilized at each location and were managed according to the producer's normal practices. Plot weights were determined at harvest using either a West Texas Lee Weigh Wagon with on-board load cells when basket-type harvesters were used, or a Western Forage Systems hydraulic portable truck scales when round module-building harvesters were used. At harvest, grab samples were collected and ginned for the determination of turnout and lint yield. Lint yields were converted to a pounds per acre basis. Lint samples were submitted to the Texas Tech University Fiber and Biopolymer Research Institute for HVI fiber analysis. Lint yield and quality data was used to determine CCC loan value and lint value per acre.

Eight locations of the on-farm variety trials were harvested in 2015, including six irrigated locations (Crosby, Dawson, Hall, Hockley, Lamb, and Mitchell counties) and two dryland locations (Dawson and Floyd counties). Average lint yield over all varieties ranged from 745 to 1941 pounds/acre over the five irrigated locations. The average loan value across all varieties ranged from 49.13 to 56.76 cents/pound, with the average lint value over all varieties ranging from $339 to $1053 per acre at the irrigated locations. For the two dryland locations, the average lint yield was 681 pounds/acre with an average loan value of 51.34 cents/pound and lint value of $349 per acre at Dawson County. At the Floyd County

location, the average yield over all varieties was 540 pounds/acre with an average loan value of 50.07 cents/pound and lint value of $270 per acre. An additional dryland site in Lubbock County was lost due to hail.

Materials and Methods

The number of commercial cotton varieties evaluated at each on-farm location varied between four and ten, with the specific varieties for each location presented in the results for each location below. Equipment belonging to the grower-cooperator was utilized for the planting, management, and harvest of the studies, so that row spacing varied between 36 or 40 inches, dependent on individual producer practices. The planting and harvest dates for all locations and other site specific details are presented in Table 1.

Results

Dawson County Dryland

Six commercial varieties were evaluated in the Dawson County dryland trial, with four replications of each variety (Table 2). The varieties included Deltapine 1219B2RF (DP 1219B2RF), FiberMax 1900GLT (FM 1900GLT), FiberMax 2334GLT (FM 2334GLT), PhytoGen 333WRF (PHY 333WRF), PhytoGen 417WRF (PHY 417WRF), and Stoneville 4946GLB2 (ST 4946GLB2). The average lint yield over all varieties in the trial was 681 pounds/acre. No significant difference in lint yield was present among the varieties, ranging from 655 to 737 pounds/acre. The variety ST 4946GLB2 resulted in a higher micronaire value than PHY 333WRF, PHY 417WRF, and FM 1900GLT. ST 4946GLB2 resulted in greater fiber uniformity than DP 1219 B2RF and FM 1900GLT, and also higher fiber strength values than all other varieties. No differences in fiber length and leaf grade, or loan values and lint values were present among the six varieties. Loan values ranged from 50.05 to 53.44 cents/pound, with lint values ranging from $332 to $372 per acre.

Dawson County Irrigated

The same six commercial varieties, DP 1219B2RF, FM 1900GLT, FM 2334GLT, PHY 333WRF, PHY 417WRF, and ST 4946GLB2 were evaluated in four replications at the irrigated location in Dawson County (Table 3). The average lint yield across all varieties was 1,077 pounds/acre, and ranged from 1016 to 1160 pounds/acre. The only significant difference present among the varieties was in micronaire values, where ST 4946GLB2 and FM 2334GLT resulted in higher values than PHY 333WRF and PHY 417WRF. Loan values ranged from 51.99 to 53.10 cents/pound while lint values ranged from $540 to $615 per acre.

Floyd County Dryland

There were six commercial varieties evaluated at the Floyd County dryland site, which included four replications of PhtyoGen 339WRF (PHY 339WRF), ST 4946GLB2, FM 1900GLT, PhytoGen 222WRF (PHY 222WRF), PHY 333WRF, and Croplan 3885B2XF (CP 3885B2XF). There was no difference among varieties in regards to lint yield, with the average lint yield across all varieties in the trial being 540

pounds/acre, and ranging from 460 to 597 pounds/acre. There were differences present among varieties in micronaire, fiber length, fiber strength, and leaf grade, which are presented in Table 4. No differences were present in loan values, which ranged from 48.99 to 51.84 cents/pound, or lint values which ranged from $231 to $309 per acre.

Floyd County Irrigated

Three replications of ten commercial varieties were evaluated at the Floyd Count irrigated site, including FiberMax 2011GT (FM 2011GT), Stonville 4747GLB2 (ST 4747GLB2), Deltapine 1410B2RF (DP 1410B2RF), PHY 339WRF, PHY 333WRF, NexGen 1211B2RF (NG 1511B2RF), FM 2334GLT, NexGen 3306B2RF (NG 3306B2RF), Deltapine 1321B2RF (DP 1321B2RF), and FM 1900GLT. Statistical differences between varieties were present for all parameters (Table 5). The trial average lint yield was 745 pounds/acre and ranged from 644 to 795 pounds/acre across all varieties. The top six yielding varieties, FM 2011GT, FM 2334GLT, PHY 333WRF, DP 1410B2RF, PHY 339WRF, and NG 1511B2RF resulted in greater lint yield than the lowest yielding variety, FM 1900GLT. Loan values ranged from 49.13 to 56.28 cents/pound, with the top two varieties (FM 2334GLT and NG 3306B2RF) resulting in higher loan values than DP 1410B2RF, NG 1511B2RF, FM 1900GLT, and PHY 333WRF. Lint values ranged from $339 to $455 per acre, with FM 2334GLT resulting in greater lint values than NG 1511B2RF, PHY 333WRF, and FM 1900GLT.

Hall County Irrigated

Ten commercial varieties were evaluated at the irrigated Hall County site, which included three replications of each variety. The varieties included ST 4946GLB2, NexGen 1511B2RF (NG 1511B2RF), FiberMax 1830GLT (FM 1830GLT), NexGen 3306B2RF (NG 3306B2RF), PHY 333WRF, CP 3885B2XF, Deltapine 1522B2XF (DP 1522B2XF), PHY 417WRF, Deltapine 1518B2XF (DP 1518B2XF), and Deltapine 1549B2XF (DP 1549B2XF). The average trial yield was 767 pounds/acre, and ranged from 650 to 847 pounds/acre, with no difference among varieties. Differences were present due to variety in micronaire, fiber length, fiber uniformity, fiber strength, leaf grade, and loan value (Table 6). The variety NG 3306B2RF had the highest loan value among the varieties, and was significantly greater than all varieties except for FM 1830GLT and DP 1522B2XF. DP 1518B2XF resulted in a lower loan value than all other varieties. There was no difference present in regards to lint value, which ranged from $343 to $446 per acre.

Hockley County Irrigated

Five commercial varieties, including ST 4946GLB2, PHY 333WRF, PHY 417WRF, FM 1830GLT, and CP 3885B2XF were evaluated in three replications at the Hockley County irrigated trial. The average lint yield was 1100 pounds/acre, with a significant difference in yield between the top yielding variety, ST 4946GLB2 (1382 pounds/acre) and the lowest yielding variety CP 3885B2XF (801 pounds/acre). Differences in fiber length, fiber uniformity, fiber strength, leaf grad, loan value and lint value are presented in (Table 7). Loan values ranged from 55.73 to 57.63 cents/pound with PHY 333WRF resulting in a lower loan value than CP 3885B2XF and FM 1830GLT. Reflective of the lint yields, a significant difference was also present in lint value with ST 4946GLB2 having a higher value ($784 per acre) than CP 3885B2XF ($461 per acre).

Lamb County Irrigated

Four commercial varieties were evaluated at the Lamb county irrigated trial, which included three replications of Stoneville 4747GLB2 (ST 4747GLB2), FM 1830GLT, PHY 222WRF, and PHY 333WRF (Table 8). The trial yield average was 1941 pounds/acre, and ranged from 1816 to 2074 pounds/acre. The only difference among varieties across all yield, quality, and economic parameters was in the fiber strength measurement. Loan values ranged from 53.5 to 54.8 cents/pound with lint values ranging from $997 to $1107 per acre.

Mitchell County Irrigated

Three replications of PhytoGen 499WRF (PHY 499WRF), PHY 333WRF, FM 2334GLT, and ST 4747GLB2 were evaluated at the Mitchell County irrigated location (Table 9). The average lint yield over all varieties was 1341 pounds/acre and variety averages ranged from 1237 to 1446 pounds/acre, with no significant differences present due to variety. ST 4747GLB2 resulted in lower micronaire than PHY 499WRF and FM 2334GLT, while PHY 499WRF had shorter fiber length than all other varieties. Loan values ranged from 47.32 to 51.75 cents/pound with lint values ranging from $638 to $709 per acre.

Table 1. Details of the seven locations of on-farm commercial variety trials in 2015.

Location	Irrigated/Dryland	Majority Soil Type	Planting Date	Harvest Date
Dawson County	Dryland	Acuff sandy loam	May 27	October 19
Dawson County	Irrigated	Acuff sandy clay	May 21 & 22	November 2
Floyd County	Dryland	Pullman clay loam	June 1	October 27
Hall County	Irrigated	Altus fine sandy loam	May 31	November 18
Hockley County	Irrigated	Amarillo fine sandy loam	May 26	November 12
Lamb County	Irrigated	Amarillo fine sandy loam	May 26	November 19
Mitchell County	Irrigated	Snyder loam	June 6	November 11

Table 2. Results from the Dawson County dryland trial.

Variety	Lint Yield (lbs/acre)	Turnout (%)	Micronaire	Fiber Length (inches)	Uniformity (%)	Strength (g/tex)	Leaf Grade	Loan Value (cents/lb.)	Lint Value ($/acre)
ST 4946GLB2	737	37.2	4.8	1.06	82	31	4	50.39	372
PHY 417WRF	682	36.0	4.5	1.07	81	30	3	50.05	341
FM 1900GLT	673	36.5	4.4	1.06	80	30	4	52.04	350
DP 1219B2RF	672	35.8	4.7	1.06	80	30	4	51.26	344
FM 2334GLT	668	37.4	4.7	1.10	81	30	3	53.44	356
PHY 333WRF	654	36.7	4.5	1.07	81	30	4	50.84	332
LSD	*NS*	*NS*	*0.2*	*NS*	*NS*	*1*	*NS*	*NS*	*NS*
CV	*8.6*	*6.0*	*3.6*	*3.4*	*1.1*	*2.2*	*37.8*	*6.6*	*10.1*
p-value	*0.4595*	*0.8833*	*0.035*	*0.6666*	*0.2369*	*0.0774*	*0.9623*	*0.7469*	*0.6914*

LSD – least significant difference at the 0.1 level of significance (NS = no significant differences).
CV – coefficient of variation.
p-value – denotes significant difference at $\alpha \leq 0.1$.

Table 3. Results from the Dawson County irrigated trial.

Variety	Lint Yield (lbs/acre)	Turnout (%)	Micronaire	Fiber Length (inches)	Uniformity (%)	Strength (g/tex)	Leaf Grade	Loan Value (cents/lb.)	Lint Value ($/acre)
DP 1219B2RF	1160	37.6	4.3	1.12	80	32	4	53.03	615
PHY 417WRF	1158	36.3	4.0	1.12	80	32	4	52.39	607
ST 4946GLB2	1047	35.6	4.4	1.14	82	33	5	51.99	542
FM 2334GLT	1046	35.5	4.4	1.15	81	31	5	52.23	546
PHY 333WRF	1037	36.0	4.0	1.13	81	31	5	52.46	544
FM 1900GLT	1016	34.9	4.2	1.14	81	32	5	53.10	540
LSD	*NS*	*NS*	*0.3*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
CV	*12.5*	*7.1*	*5.5*	*2.8*	*1.2*	*4.4*	*27.5*	*5.1*	*13.2*
p-value	*0.4905*	*0.7651*	*0.0686*	*0.7121*	*0.2214*	*0.3837*	*0.8899*	*0.9889*	*0.5012*

LSD – least significant difference at the 0.1 level of significance.

CV – coefficient of variation.

p-value – denotes significant difference at $\alpha \leq 0.1$.

Table 4. Results from the Floyd County dryland trial.

Variety	Lint Yield (lbs/acre)	Turnout (%)	Micronaire	Fiber Length (inches)	Uniformity (%)	Strength (g/tex)	Leaf Grade	Loan Value (cents/lb.)	Lint Value ($/acre)
PHY 339WRF	597	35.8	4.0	1.08	81	31	3	51.84	309
ST 4946GLB2	584	32.9	4.4	1.06	81	32	5	48.99	286
FM 1900GLT	542	32.8	4.0	1.09	81	31	5	50.24	272
PHY 222WRF	532	32.8	4.4	1.06	82	30	4	49.59	263
PHY 333WRF	526	28.6	4.2	1.10	81	31	5	49.56	261
CP 3885B2XF	460	32.7	4.5	1.04	81	29	1	50.23	231
LSD	*NS*	*NS*	*0.3*	*0.02*	*NS*	*1.1*	*1*	*NS*	*NS*
CV	*14.4*	*12.9*	*5.5*	*1.3*	*0.6*	*2.4*	*24.1*	*4.0*	*14.0*
p-value	*0.2243*	*0.3514*	*0.0105*	*<.0001*	*0.0646*	*0.0005*	*0.0002*	*0.4699*	*0.1451*

LSD – least significant difference at the 0.1 level of significance.

CV – coefficient of variation.

p-value – denotes significant difference at $\alpha \leq 0.1$.

Table 5. Results from the Floyd County irrigated trial.

Variety	Lint Yield (lbs/acre)	Turnout (%)	Micronaire	Fiber Length (inches)	Uniformity (%)	Strength (g/tex)	Leaf Grade	Loan Value (cents/lb)	Lint Value ($/acre)
FM 2011GT	795	35.88	4.6	1.12	81	32	2	55.37	440
FM 2334GLT	792	38.85	4.2	1.17	83	34	3	56.28	455
PHY 333WRF	785	32.86	4.0	1.13	82	32	5	49.13	386
DP 1410B2RF	761	32.64	3.8	1.15	80	34	4	53.45	407
PHY 339WRF	749	32.86	4.0	1.12	82	32	3	54.85	411
NG 1511B2RF	746	35.27	4.3	1.06	81	32	4	50.85	392
DP 1321B2RF	735	33.67	4.2	1.10	82	33	3	54.35	399
ST 4747GLB2	733	31.61	4.0	1.14	79	30	3	53.90	395
NG 3306B2RF	711	31.23	4.1	1.16	83	35	3	56.06	401
FM 1900GLT	644	35.51	4.1	1.14	81	33	6	50.80	339
LSD	93	3.44	0.4	0.03	1	2	1	2.5291	61
CV	7.31	5.93	5.64	1.48	0.86	3.29	21.26	2.49	7.94
p-value	0.0875	0.0048	0.0698	0.0002	0.0004	0.0094	0.0045	0.0001	0.0958

LSD – least significant difference at the 0.1 level of significance (NS = no significant differences).

CV – coefficient of variation.

p-value – denotes significant difference at $\alpha \leq 0.1$.

Table 6. Results from the Hall County irrigated trial.

Variety	Lint Yield (lbs/acre)	Turnout (%)	Micronaire	Fiber Length (inches)	Uniformity (%)	Strength (g/tex)	Leaf Grade	Loan Value (cents/lb.)	Lint Value ($/acre)
ST 4946GLB2	847	34.9	3.5	1.09	81	33	4	52.30	443
NG 1511B2RF	827	35.7	3.8	1.09	81	32	4	53.35	442
FM 1830GLT	805	35.3	3.7	1.17	81	33	4	55.37	446
NG 3306B2RF	783	32.5	3.7	1.17	82	35	3	55.77	436
PHY 333WRF	783	32.8	3.7	1.13	81	31	5	52.85	414
CP 3885B2XF	778	35.5	4.0	1.06	80	29	3	53.18	414
DP 1522B2XF	766	33.9	4.0	1.09	81	32	3	54.05	414
PHY 417WRF	737	34.0	3.5	1.06	80	30	3	52.18	384
DP 1518B2XF	690	32.6	3.5	1.14	80	30	5	49.78	343
DP 1549B2XF	650	32.1	3.5	1.08	79	31	3	53.20	346
LSD	*NS*	*NS*	*0.2*	*0.03*	*1*	*1*	*1*	*2.22*	*NS*
CV	*15.9*	*7.1*	*3.0*	*1.4*	*0.7*	*2.3*	*16.6*	*2.4*	*16.6*
p-value	*0.676*	*0.5089*	*<.0001*	*<.0001*	*<.0001*	*<.0001*	*0.001*	*0.0012*	*0.4944*

LSD – least significant difference at the 0.1 level of significance.

CV – coefficient of variation.

p-value – denotes significant difference at $\alpha \leq 0.1$.

Table 7. Results from the Hockley County irrigated trial.

Variety	Lint Yield (lbs/acre)	Turnout (%)	Micronaire	Fiber Length (inches)	Uniformity (%)	Strength (g/tex)	Leaf Grade	Loan Value (cents/lb.)	Lint Value ($/acre)
ST 4946GLB2	1382	34.5	4.1	1.13	81	34	3	56.73	784
PHY 333WRF	1138	35.6	4.0	1.13	81	32	4	55.73	634
PHY 417WRF	1100	35.1	3.8	1.11	80	32	3	56.40	620
FM 1830GLT	1079	37.3	3.8	1.18	82	33	3	57.32	619
CP 3885B2XF	801	33.8	3.8	1.13	81	30	1	57.63	461
LSD	*376*	*NS*	*NS*	*0.30*	*1*	*1*	*1*	*1.42*	*216*
CV	*18.8*	*20.6*	*4.2*	*1.6*	*0.7*	*1.8*	*17.2*	*1.4*	*19.1*
p-value	*0.0721*	*0.9796*	*0.1059*	*0.0053*	*0.0222*	*0.0002*	*0.0004*	*0.0859*	*0.087*

LSD – least significant difference at the 0.1 level of significance.

CV – coefficient of variation.

p-value – denotes significant difference at $\alpha \leq 0.1$.

Table 8. Results from the Lamb County irrigated trial.

Variety	Lint Yield (lbs/acre)	Turnout (%)	Micronaire	Fiber Length (inches)	Uniformity (%)	Strength (g/tex)	Leaf Grade	Loan Value (cents/lb.)	Lint Value ($/acre)
ST 4747GLB2	2074	35.4	4.2	1.18	81	31	5	53.50	1107
FM 1830GLT	1941	34.1	3.8	1.19	82	32	4	53.85	1059
PHY 222WRF	1935	34.4	4.4	1.15	83	31	4	54.35	1051
PHY 333WRF	1816	33.3	4.0	1.16	82	33	4	54.80	997
LSD	*NS*	*NS*	*NS*	*NS*	*NS*	*1*	*NS*	*NS*	*NS*
CV	*21.2*	*6.4*	*6.3*	*3.5*	*1.5*	*1.8*	*19.2*	*4.6*	*23.0*
p-value	*0.8952*	*0.721*	*0.1587*	*0.6738*	*0.5341*	*0.0182*	*0.7189*	*0.9215*	*0.9559*

LSD – least significant difference at the 0.1 level of significance.

CV – coefficient of variation.

p-value – denotes significant difference at $\alpha \leq 0.1$.

Table 9. Results from the Mitchell County irrigated trial.

Variety	Lint Yield (lbs/acre)	Turnout (%)	Micronaire	Fiber Length (inches)	Uniformity (%)	Strength (g/tex)	Leaf Grade	Loan Value (cents/lb.)	Lint Value ($/acre)
PHY 499WRF	1446	36.8	4.6	1.11	82	34	5	49.02	709
PHY 333WRF	1355	35.1	4.4	1.16	82	32	6	47.32	638
FM 2334GLT	1326	36.1	4.5	1.16	82	33	5	50.93	676
ST 4747GLB2	1237	32.6	4.2	1.19	82	32	5	51.75	639
LSD	*NS*	*NS*	*0.3*	*0.05*	*NS*	*NS*	*NS*	*NS*	*NS*
CV	*15.2*	*6.9*	*3.3*	*2.4*	*1.2*	*4.8*	*26.5*	*5.6*	*14.5*
p-value	*0.6718*	*0.2505*	*0.0481*	*0.0503*	*0.9756*	*0.4004*	*0.5386*	*0.2862*	*0.7799*

LSD – least significant difference at the 0.1 level of significance.

CV – coefficient of variation.

p-value – denotes significant difference at $\alpha \leq 0.1$.