

2009 Arizona Cotton Growers Association Breeding Program Preliminary and Advanced Strain Testing Program

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Abstract

A series of experiments were conducted across three locations in Arizona to evaluate advanced and preliminary strains from the Arizona Cotton Growers Breeding Program. These trials were conducted in Yuma, AZ (130 ft. above MSL); Maricopa, AZ (1170 ft. above MSL); and Safford, AZ (2900 ft. above MSL). Strains were planted in four row plots extending 38 feet in a randomized complete block design with a minimum of four replications. All data was subjected to statistical analysis to test for differences among strains for yield and fiber quality. Yield was down at the Yuma location in 2009 and in this trial ranged from a low of 812 to just over 1200 pounds lint per acre. Fiber quality was also off with many entries receiving discounts for lower fiber quality. Most of the discounts were due to short staple in higher micronaire. The Maricopa location experienced excellent yields for the 2009 season. The lowest yielding variety produced 1257 and the highest yielding just under 2000 pounds lint per acre. Fiber quality was also excellent for this location with only one entry receiving a discount. The Safford location produced average yields for the 2009 season. Yields ranged from 995 to just under 1600 pounds of lint per acre. Fiber quality was a mixed bag with several entries receiving discounts for fiber quality due primarily to higher micronaire and short staple. At all three locations the Arizona Cotton Growers Association (ACGA) preliminary advanced strains did extremely well when compared to the commercial control entries with respect to both lint yield and fiber quality.

Introduction

One of the most critical decisions a cotton producer will make during the course of the season is which variety is best suited to the region and growing style of a particular operation. With the advent of transgenic technologies and the introduction of new varieties that decision can be very difficult. The decision of a seed company to bring a variety to market and release it for general consumption is made after several years of testing through a breeding program. One of the last steps of a breeding program prior to commercial release is testing of the advanced strains across environments.

The Arizona Cotton Growers Association (ACGA) breeding program is currently in a state of transition without a breeder under contract. However a significant amount of germplasm exists that was developed by the previous breeder which has not been extensively evaluated. The purpose of this project is to continue with the evaluation of preliminary and advanced strain genetic materials that have been developed from the Arizona Cotton Growers Association breeding program. The data generated from these projects has and will continue to provide valuable information to the current program. It allows for decisions to be made with respect to current and future advances in germplasm based upon yield and fiber quality performance characteristics of the genetic material.

Conducting this program in conjunction with, but independent of, the Arizona Upland Cotton Advanced Strains testing program allows for a cost effective method of conducting the evaluations. It also provides quality, unbiased data to support the decision making of the ACGA breeding program. A testing program conducted at multiple locations provides for a powerful database to evaluate the genetic material in question with an opportunity to examine the stability of the strains

across varying yield potential conditions.

Materials and Methods

Three separate field trials were conducted in 2009 across the cotton producing regions of Arizona. These locations included Yuma (130 ft above MSL), Maricopa (1170 ft. above MSL), and Safford (2900 ft above MSL). Plot dimensions were four rows wide and extended 38 feet in length. Row spacing varied among locations with 38, 40, and 42 inch row spacing at Safford, Maricopa, and Yuma respectively. All plots were arranged in a randomized complete block design with four replications. Plots were planted 200 seeds per 40 feet of row length to achieve a plant population of 3-5 plants per linear foot. Further details of each experiment including planting dates, irrigation termination dates, defoliation and harvest dates are contained in Table 1.

Final plant height data was collected from each entry near harvest. Yield was determined by harvesting the center two rows of each experimental unit and weighed with a hanging basket equipped with load cells. A large grab sample (approximately 8 lbs) was also collected from each experimental unit from which percent lint was determined by ginning the sample on a small research gin at the Maricopa Agricultural Center. Fiber quality was determined by the UADA-AMS cotton classing office in Visalia, CA. A premium or discount for each entry was then determined based upon fiber quality data and the USDA CCC (Commodity Credit Corporation) loan schedule. This premium/discount was then applied to a base price of 52 cents per pound and a final crop value was calculated by multiplying the base price plus the premium/discount by the total lint yield of the variety. At harvest, a 50 boll hand-picked sample was also collected from each experimental unit to determine seedcotton weight per boll providing an indication of boll size. All data collected was summarized and analyzed according to statistical procedures as outlined by the SAS Institute.

Results and Conclusions

Yuma

The Yuma location was planted later than usual on 4 March and irrigated to initiate germination on 7 March. Cool conditions in February delayed a normal optimum planting of mid-February. Early season vigor and growth was low with abnormally cool conditions in May and June. Temperatures rose dramatically in July and August during peak bloom resulting in heat induced fruit loss. These conditions resulted in lower than average yields for this region. Final irrigation was applied on 5 August and was defoliated two weeks later on 21 August. Plots were harvested on 3 September. Average final plant height is presented in Figure 1 for the Yuma location and ranges from 35 to 50 inches. Final lint yield and fiber quality data are presented in Table 2 for the Yuma location. Lint yield ranged from a low of 812 pounds to just over 1200 pounds lint per acre. Several varieties received discounts for fiber quality due primarily short staple. Figure 2 presents a scatter plot of lint yield versus premiums associated with fiber quality. Horizontal and vertical reference lines represent average values for lint yield and premium respectively. The upper right-hand quadrant represents varieties that performed better than average with respect to both lint yield and fiber quality. The distribution of this data shows that the majority of the varieties in this trial fell in the upper left-hand quadrant and in the lower right-hand quadrant indicating that the higher-yielding varieties produced lower fiber quality while the lower yielding varieties produced higher fiber quality.

Maricopa

Plots were established at the Maricopa site on 20 April and were planted into a window of relatively good weather for

germination. Excellent early season vigor and fruit set provided the foundation for an excellent crop. The lack of monsoon activity in July and August and thereby the lower humidity levels allowed for retention of much of the fruit that was set during that time. Final irrigation for these plots was applied on 7 September with defoliation occurring on 1 October. Plots were harvested on 27 October. Data for average final plant height is presented in Figure 3 and ranged from 35 to 45 inches. Final lint yield and fiber quality data are presented in Table 3 along with statistical analysis data. Lint yield results in this trial were exceptional for the 2009 season with a low of 1257 pounds and high of just under 2000 pounds lint per acre. Fiber quality at this location and for these entries was also excellent for 2009 with only one variety receiving a slight discount of 0.6 cents per pound. Figure 4 presents a scatter plot of lint yield and premium for the Maricopa location with the vertical line representing the average of the premium and the horizontal reference line representing the average of the lint yield. Distribution of the data at the Maricopa location was clustered right around the average of the trial with no clear trend in yield and fiber quality relationships.

Safford

Plots were established in Safford on 21 April 2009 by planting into moist soil mulch. Seedlings emerged approximately 10 days later. Cooler than average temperatures following planting along with cooler than average temperatures during the months of May and June led to slow growth and less vigor than normal. However, the warmer than average temperatures during the months of July and August and the first part of September made up for the cooler temperatures early in the season. A good fruit load was established and a slightly better than average crop year was experienced at the Safford location. Final irrigation was applied on 25 August with defoliation occurring on 13 October. Plots were harvested on 12 November. Final average plant height data is presented in Figure 5 and ranged from 25 to 40 inches. All final yield and fiber quality data is presented in Table 4 for the Safford location. Lint yields for this particular trial in 2009 were much improved from previous years of looking at Arizona Cotton Growers Association (ACGA) preliminary and advanced strains. Yields in 2009 ranged from 995 pounds just under 1600 pounds lint per acre. Several entries in this trial did suffer some discounts due to fiber quality primarily as a result of higher micronaire and lower fiber staple. Figure 6 presents the scatter plot of data including lint yield and premium associated with fiber quality with horizontal and vertical reference lines again representing the average value for lint yield and premium respectively. The data from the Safford location does not show any relationship with respect to fiber quality and lint yield with data fairly randomly distributed around the intersection of the two mean reference lines. It is interesting to note however, that many of these ACGA entries performed significantly better than the control varieties where this test was located in 2009.

Table 1. Significant crop management dates for each ACGA preliminary and advanced strain evaluation location conducted during the 2009 growing season.

Location:	Yuma	Maricopa	Safford
Planting Date:	7 March 2009	20 April 2009	21 April 2009
Final Irrigation	5 August 2009	7 September	25 August 2009
Defoliation	21 August	1 October	13 October 2009
Harvest Date:	3 September 2009	27 October 2009	12 November 2009

Table 2. Yield, fiber quality, and boll weight mean data along with statistical analysis for each of the ACGA preliminary and advanced strains evaluated in Yuma, AZ, 2009.

Variety	Variety Identifier	Lint Yield	Means Separation *	Lint Turnout	Boll Weight	HVI Color	Staple	Strength	Length	Uniformity	Micronaire	Leaf Grade	Premium	Value
		lbs/acre		Percent	grams		32nds	g/tex	Inches	Percent			cent/lb	\$/acre
0157-2031-3B-701	ACGA251	1200.4	a	33.7	4.72	41	35	30.0	1.10	81.3	5.1	2	0.1	\$626.41
0144-2086-3B-701	ACGA250	1198.5	a	32.6	4.84	31	35	30.9	1.07	81.7	5.1	2	0.4	\$623.27
0112-2014-313-601-701	ACGA267	1189.7	a	31.9	4.69	21	32	26.8	1.01	78.9	4.4	2	-1.8	\$595.83
0101-2165-303-701	ACGA242	1177.7	a b	33.5	4.37	31	35	30.1	1.09	80.9	4.4	1	2.9	\$643.04
0122-2033-303-701	ACGA246	1177.5	a b c	33.3	4.60	31	35	29.7	1.08	81.7	4.9	2	2.6	\$637.92
0114-2001-304-601-701	ACGA268	1174.6	a b c d	33.1	5.22	31	33	27.8	1.04	80.1	4.4	2	-0.2	\$608.29
0122-2033-307-701	ACGA247	1167.7	a b c d e	32.7	5.30	31	35	29.0	1.07	81.0	5.0	1	1.5	\$619.42
0109-2026-302-601-701	ACGA263	1167.1	a b c d e	30.9	5.20	41	35	29.3	1.08	80.1	4.7	2	1.3	\$621.16
39-501-601-701-801	ACGA039	1164.7	a b c d e	33.5	5.10	31	34	29.8	1.07	80.4	4.8	2	1.4	\$619.71
0120-2029-301-501-601-701-801	ACGA082	1156.5	a b c d e	30.4	5.03	31	36	32.7	1.12	81.2	5.0	2	2.4	\$623.16
0115-2100-300-501-601-701	ACGA269	1154.6	a b c d e	31.6	4.60	31	34	26.3	1.07	79.4	4.4	2	0.9	\$605.77
0119-2006-307-601-701	ACGA273	1122.6	a b c d e f	32.0	4.82	31	35	31.4	1.10	81.8	5.1	2	1.3	\$594.31
0101-2141-301-501-601-701	ACGA253	1106.2	a b c d e f g	32.1	5.20	31	34	26.7	1.06	79.1	4.4	2	1.9	\$592.85
0116-2015-309-501-601-701-801	ACGA070	1089.1	a b c d e f g h	30.2	5.55	31	36	33.1	1.12	81.1	5.3	2	1.7	\$579.18
0101-2100-302-501-601-701	ACGA252	1086.6	a b c d e f g h	32.4	4.73	31	34	27.9	1.06	79.7	4.6	2	1.7	\$580.52
0118-2B-304-601-701	ACGA272	1080.8	a b c d e f g h	31.1	4.76	31	34	27.6	1.04	80.3	4.6	2	1.4	\$574.67
0116-2015-302-501-601-701	ACGA271	1076.7	a b c d e f g h	30.2	5.42	31	36	32.2	1.12	81.0	5.0	2	2.4	\$581.52
0106-2004-3B-701	ACGA243	1076.3	a b c d e f g h	33.4	4.74	31	34	29.8	1.07	80.3	5.2	2	-0.6	\$548.27
0109-2026-310-601-701	ACGA264	1060.9	a b c d e f g h	28.3	5.49	31	36	32.9	1.14	81.6	5.1	2	2.3	\$572.10
0119-2016-303-601-701	ACGA274	1043.8	b c d e f g h i	33.2	4.51	31	36	32.4	1.13	82.0	4.9	3	4.1	\$581.00
0122-2036-303-701	ACGA248	1036.9	c d e f g h i	32.2	5.12	31	34	30.0	1.07	81.7	4.8	2	1.5	\$551.91
0112-2016-301-701	ACGA244	1036.7	d e f g h i	29.7	5.27	31	36	32.6	1.11	82.3	5.2	2	2.4	\$559.15
0102-2032-302-601-701	ACGA254	1036.6	e f g h i	30.3	5.51	31	34	30.1	1.07	81.6	5.0	2	0.3	\$539.98
0106-2008-301-601-701	ACGA257	1028.3	e f g h i	31.7	5.09	31	35	31.3	1.10	81.6	5.2	2	1.7	\$547.83
0109-2024-301-601-701	ACGA261	1012.6	f g h i j	30.8	4.82	31	34	29.2	1.06	80.3	4.9	2	1.1	\$532.05
0106-2008-305-601-701	ACGA259	1007.6	f g h i j	28.2	5.04	31	37	31.4	1.14	81.5	4.8	2	5.1	\$569.97
0106-2008-303-601-701	ACGA258	997.0	f g h i j	28.4	5.02	31	36	32.1	1.12	81.9	5.0	2	2.4	\$537.26
0104-2019-301-601-701	ACGA256	980.5	g h i j k	30.4	4.62	31	34	30.4	1.07	81.0	4.7	2	2.7	\$533.31
0116-2015-306-501-601-701-801	ACGA068	967.5	g h i j k	30.1	5.57	31	35	31.6	1.10	81.9	5.2	2	1.1	\$510.66
0112-2014-309-601-701	ACGA266	963.0	h i j k	28.5	4.47	31	33	30.4	1.04	81.8	4.9	2	-0.5	\$496.65
0109-2024-304-601-701	ACGA262	961.7	h i j k	31.2	5.08	31	34	30.3	1.08	81.4	5.0	2	1.5	\$509.70
ST45542RF	ST45542RF	961.5	h i j k	31.0	4.73	31	35	31.3	1.08	81.8	5.0	3	2.3	\$518.79
0116-2B-326-701	ACGA245	960.2	h i j k	30.7	4.99	31	35	33.8	1.08	83.0	5.1	2	2.3	\$517.47
0116-2011-309-501-601-701	ACGA270	954.5	h i j k	28.6	5.12	31	37	33.4	1.15	82.3	5.0	2	3.2	\$520.53
0122-2015-305501-601-701-801	ACGA078	915.1	i j k l	30.5	5.03	31	36	30.5	1.10	80.6	5.0	2	2.2	\$491.40
0106-2011-308-601-701	ACGA260	881.3	j k l	28.3	4.32	21	35	30.7	1.10	80.0	4.5	2	4.0	\$489.94
DP161B2RF	DP161B2RF	878.2	j k l	30.3	4.46	41	37	31.5	1.14	81.5	4.5	3	3.0	\$481.85
0109-2027-302-601-701	ACGA265	854.1	k l	28.9	5.17	31	34	29.3	1.06	80.1	4.8	2	1.8	\$457.28
0144-2036-304-701	ACGA249	843.2	k l	27.0	5.08	31	36	33.0	1.13	81.8	4.9	2	4.3	\$470.09
0102-2035-302-601-701	ACGA255	812.0	l	28.0	5.03	41	34	31.6	1.07	81.7	5.1	2	-1.4	\$411.58
LSD§		140.8		1.3	0.4	---	1.0	1.4	0.03	1.0	0.2	0.1	2.5	\$77.40
OSL†		0.0001		0.0001	0.0001	---	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001
CV‡		9.6		2.9	6.0	---	2.0	3.2	1.8	0.9	2.8	17.6	125.2	9.9

*Means followed by the same letter are not statistically different according to a Fisher's least significant difference means separation test.

§ Least Significant Difference

† Observed Significance Level

‡ Coefficient of Variation

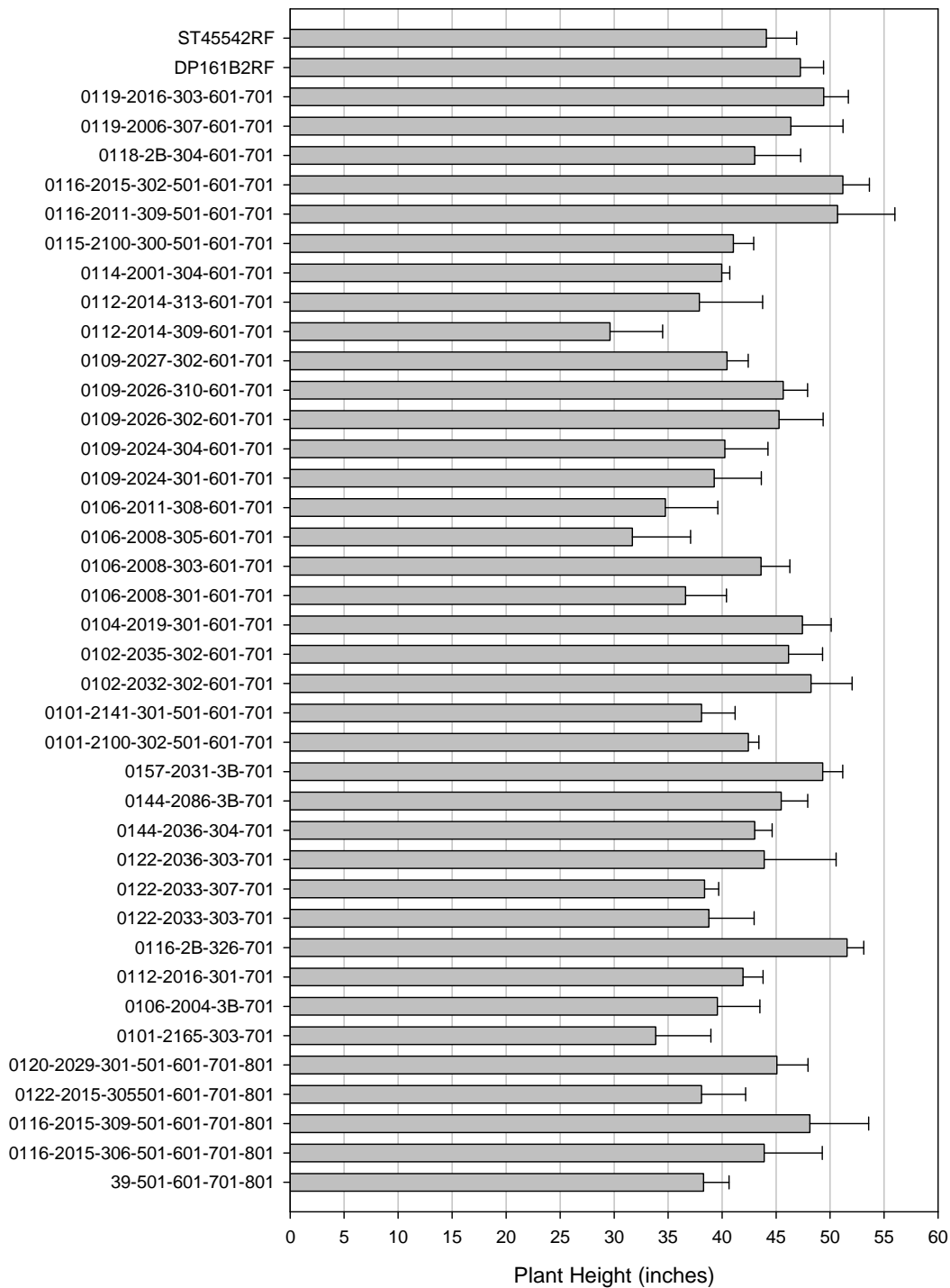
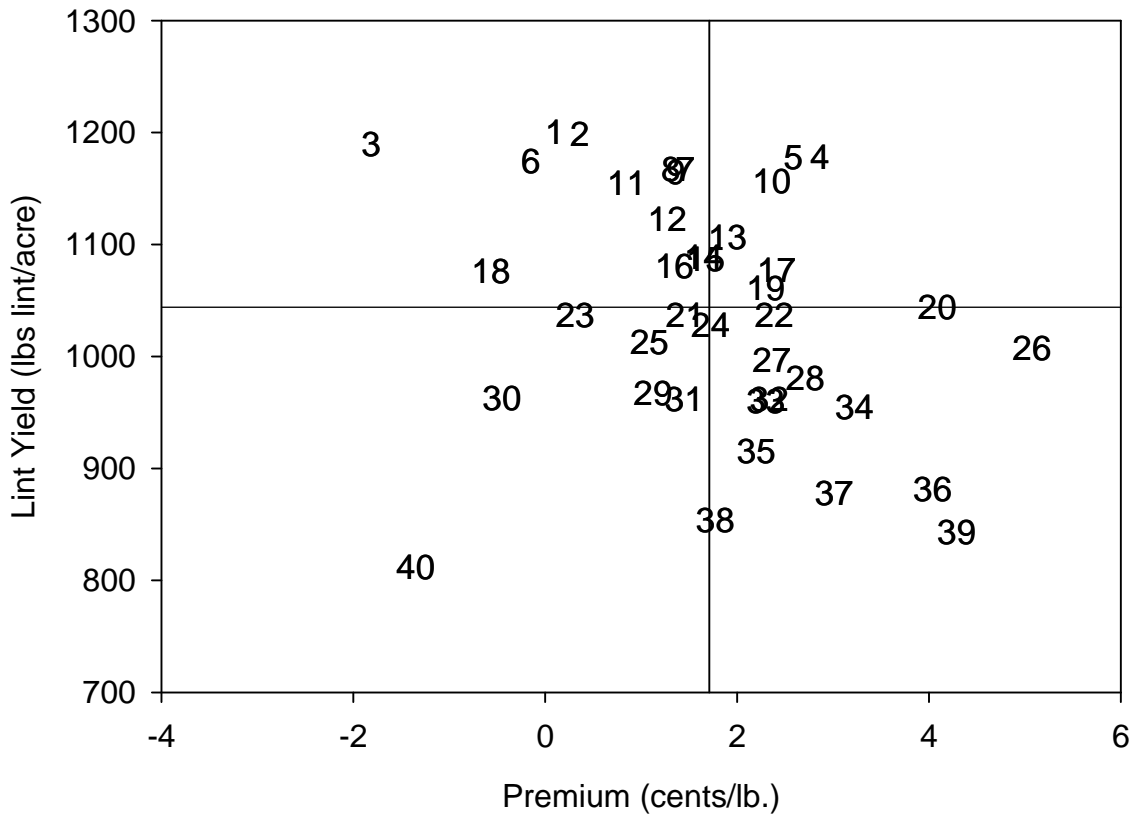


Figure 1. Mean final plant height (inches) along with the standard deviation for each of the ACMA Preliminary and advanced strains evaluated in Yuma, AZ, 2009.



1 0157-2031-3B-701	11 0115-2100-300-501-601-701	21 0122-2036-303-701	31 0109-2024-304-601-701
2 0144-2086-3B-701	12 0119-2006-307-601-701	22 0112-2016-301-701	32 ST45542RF
3 0112-2014-313-601-701	13 0101-2141-301-501-601-701	23 0102-2032-302-601-701	33 0116-2B-326-701
4 0101-2165-303-701	14 0116-2015-309-501-601-701-801	24 0106-2008-301-601-701	34 0116-2011-309-501-601-701
5 0122-2033-303-701	15 0101-2100-302-501-601-701	25 0109-2024-301-601-701	35 0122-2015-305501-601-701-801
6 0114-2001-304-601-701	16 0118-2B-304-601-701	26 0106-2008-305-601-701	36 0106-2011-308-601-701
7 0122-2033-307-701	17 0116-2015-302-501-601-701	27 0106-2008-303-601-701	37 DP161B2RF
8 0109-2026-302-601-701	18 0106-2004-3B-701	28 0104-2019-301-601-701	38 0109-2027-302-601-701
9 39-501-601-701-801	19 0109-2026-310-601-701	29 0116-2015-306-501-601-701-801	39 0144-2036-304-701
10 0120-2029-301-501-601-701-801	20 0119-2016-303-601-701	30 0112-2014-309-601-701	40 0102-2035-302-601-701

Figure 2. Lint yield (lbs/acre) plotted as a function of fiber quality premium/discount (cents/lb). Vertical and horizontal lines represent the mean value for the two parameters. Varieties that fall in the upper right quadrant formed by the mean lines produced higher than average lint yield and fiber quality. Each of the ACGA preliminary and advanced strain entries are plotted for the Yuma, AZ location in 2009.

Table 3. Yield, fiber quality, and boll weight mean data along with statistical analysis for each of the ACGA preliminary and advanced strains evaluated in Maricopa, AZ, 2009.

Variety	Variety Identifier	Lint Yield	Means Separation *	Lint Turnout	Boll Weight	HVI Color	Staple	Strength	Length	Uniformity	Micronaire	Leaf Grade	Premium	Value
		lbs/acre		Percent	grams		32nds	g/tex	Inches	Percent			cent/lb	\$/acre
0116-28-326-701	ACGA246	1993.3	a	34.5	5.26	31	36	31.4	1.11	82.2	4.9	3	3.0	\$1,095.38
39-501-601-701-801	ACGA039	1981.5	a	34.0	4.48	31	37	31.8	1.15	81.5	4.7	2	4.9	\$1,127.69
0122-2033-307-701	ACGA248	1974.9	a	32.6	5.07	31	35	30.6	1.11	82.0	5.0	2	1.7	\$1,062.77
0109-2026-302-601-701	ACGA264	1973.9	a	34.4	5.14	31	37	33.1	1.17	81.7	5.3	2	1.8	\$1,060.23
0119-2016-303-601-701	ACGA276	1970.5	a	34.2	4.25	31	36	33.0	1.14	81.6	4.9	2	3.3	\$1,087.89
ST45542RF	ST45542RF	1969.6	a	33.7	5.18	21	37	32.4	1.14	82.9	4.9	3	4.9	\$1,119.87
0144-2036-304-701	ACGA250	1951.0	a b	32.9	4.43	31	36	32.4	1.11	81.1	5.1	2	2.1	\$1,056.17
0119-2006-307-601-701	ACGA275	1942.4	a b	33.6	4.48	31	35	30.8	1.10	81.1	4.8	2	4.1	\$1,089.60
0116-2011-309-501-601-701	ACGA272	1936.5	a b	33.1	4.48	31	36	30.4	1.12	81.8	4.7	2	4.5	\$1,094.06
0109-2024-301-601-701	ACGA262	1916.2	a b c	33.0	4.68	31	37	33.2	1.14	82.4	5.1	2	1.7	\$1,030.67
0106-2004-38-701	ACGA243	1902.7	a b c d	34.2	4.06	31	36	31.8	1.13	81.4	4.8	3	3.7	\$1,059.34
DP161B2RF	DP161B2RF	1898.5	a b c d e	32.8	4.10	31	37	31.7	1.16	81.6	4.6	3	4.4	\$1,069.80
0120-2029-301-501-601-701-801	ACGA082	1893.0	a b c d e	32.3	3.73	31	37	33.5	1.14	82.6	4.9	3	3.3	\$1,047.72
0122-2033-303-701	ACGA247	1876.8	a b c d e	34.7	5.08	21	36	30.5	1.11	81.2	4.9	2	4.7	\$1,064.34
0116-2015-309-501-601-701-801	ACGA070	1871.7	a b c d e	32.3	4.82	31	37	33.0	1.15	81.9	5.2	3	1.7	\$1,005.10
0144-2086-38-701	ACGA251	1852.7	a b c d e	32.5	4.02	31	37	31.3	1.14	82.2	4.9	2	3.8	\$1,035.42
0116-2015-302-501-601-701	ACGA273	1846.0	a b c d e f g	32.7	3.83	31	37	33.3	1.15	83.3	4.5	3	4.7	\$1,046.22
0106-2011-308-601-701	ACGA261	1826.2	a b c d e f g h	32.5	4.52	31	37	33.3	1.16	82.3	4.9	2	4.1	\$1,025.42
0102-2035-302-601-701	ACGA256	1818.1	a b c d e f g h	33.1	4.54	31	36	30.5	1.11	81.5	4.7	3	3.5	\$1,008.18
0116-2015-306-501-601-701-801	ACGA068	1814.8	a b c d e f g h i	30.6	4.87	31	37	32.8	1.15	82.7	4.8	3	4.5	\$1,024.93
0104-2019-301-601-701	ACGA257	1812.6	a b c d e f g h i	31.8	4.36	31	36	31.6	1.13	81.5	5.2	2	1.1	\$961.55
0119-2023-308-601-701	ACGA245	1811.4	a b c d e f g h i	31.9	4.62	31	36	33.0	1.11	82.2	5.1	2	2.5	\$988.22
0118-28-304-601-701	ACGA274	1808.1	a b c d e f g h i	31.5	4.50	31	38	33.0	1.17	82.6	4.8	2	5.0	\$1,030.34
0109-2024-304-601-701	ACGA263	1807.2	a b c d e f g h i	31.4	4.31	31	36	30.9	1.14	81.0	4.4	3	3.8	\$1,008.75
0157-2031-38-701	ACGA252	1757.0	b c d e f g h i j	32.9	4.27	31	35	28.9	1.10	80.1	4.5	2	3.8	\$980.23
0101-2100-302-501-601-701	ACGA253	1753.6	b c d e f g h i j	32.8	4.80	21	36	29.4	1.12	79.8	4.4	2	4.4	\$989.87
0114-2001-304-601-701	ACGA270	1723.6	c d e f g h i j	29.6	4.42	31	37	32.9	1.18	82.1	4.8	3	3.2	\$951.41
0122-2036-303-701	ACGA249	1718.3	c d e f g h i j	28.6	4.84	31	37	33.7	1.16	81.6	5.1	2	1.9	\$924.86
0101-2141-301-501-601-701	ACGA254	1711.8	d e f g h i j	31.0	4.98	31	35	32.3	1.11	82.3	4.8	3	3.4	\$948.03
0102-2032-302-601-701	ACGA255	1698.9	d e f g h i j	28.7	5.16	31	37	33.8	1.14	82.3	4.9	2	3.5	\$942.37
0109-2026-310-601-701	ACGA265	1695.9	e f g h i j	28.9	4.77	21	36	30.9	1.13	80.7	4.8	2	4.7	\$962.30
0122-2015-305501-601-701-801	ACGA078	1674.5	f g h i j	30.8	4.42	31	38	33.7	1.19	82.5	4.7	2	4.3	\$942.53
0106-2008-303-601-701	ACGA259	1673.3	f g h i j	29.8	4.39	31	38	32.7	1.19	82.6	4.9	2	3.8	\$934.19
0112-2014-313-601-701	ACGA268	1642.7	g h i j	33.9	4.81	31	35	31.3	1.10	81.2	4.7	3	3.5	\$911.81
0120-2029-301-501-601-701	ACGA271	1639.9	h i j	30.7	5.08	31	37	33.2	1.16	82.3	5.2	2	1.9	\$882.48
0101-2165-303-701	ACGA242	1612.5	i j	33.1	3.98	31	36	31.6	1.11	80.9	4.0	2	4.7	\$914.80
0106-2008-301-601-701	ACGA258	1600.5	j	30.0	4.73	31	37	32.6	1.15	82.4	4.9	3	2.7	\$876.03
0112-2014-309-601-701	ACGA267	1595.4	j	33.8	4.86	21	36	31.4	1.12	81.7	4.7	2	5.0	\$907.91
0106-2008-305-601-701	ACGA260	1570.1	j	28.6	3.70	31	36	30.8	1.13	80.3	4.6	2	3.8	\$874.95
0109-2027-302-601-701	ACGA266	1257.9	k	29.4	4.34	31	34	31.3	1.06	81.8	5.0	2	-0.6	\$648.01
LSD§		204.1		2.1	0.5	---	0.9	1.3	0.03	0.9	0.2	0.6	1.9	\$114.70
OSL†		0.0001		0.0001	0.0001	---	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
CV‡		8.1		4.6	8.1	---	1.8	2.8	2.0	0.8	3.1	17.4	39.6	8.2

*Means followed by the same letter are not statistically different according to a Fisher's least significant difference means separation test.

§ Least Significant Difference

† Observed Significance Level

‡ Coefficient of Variation

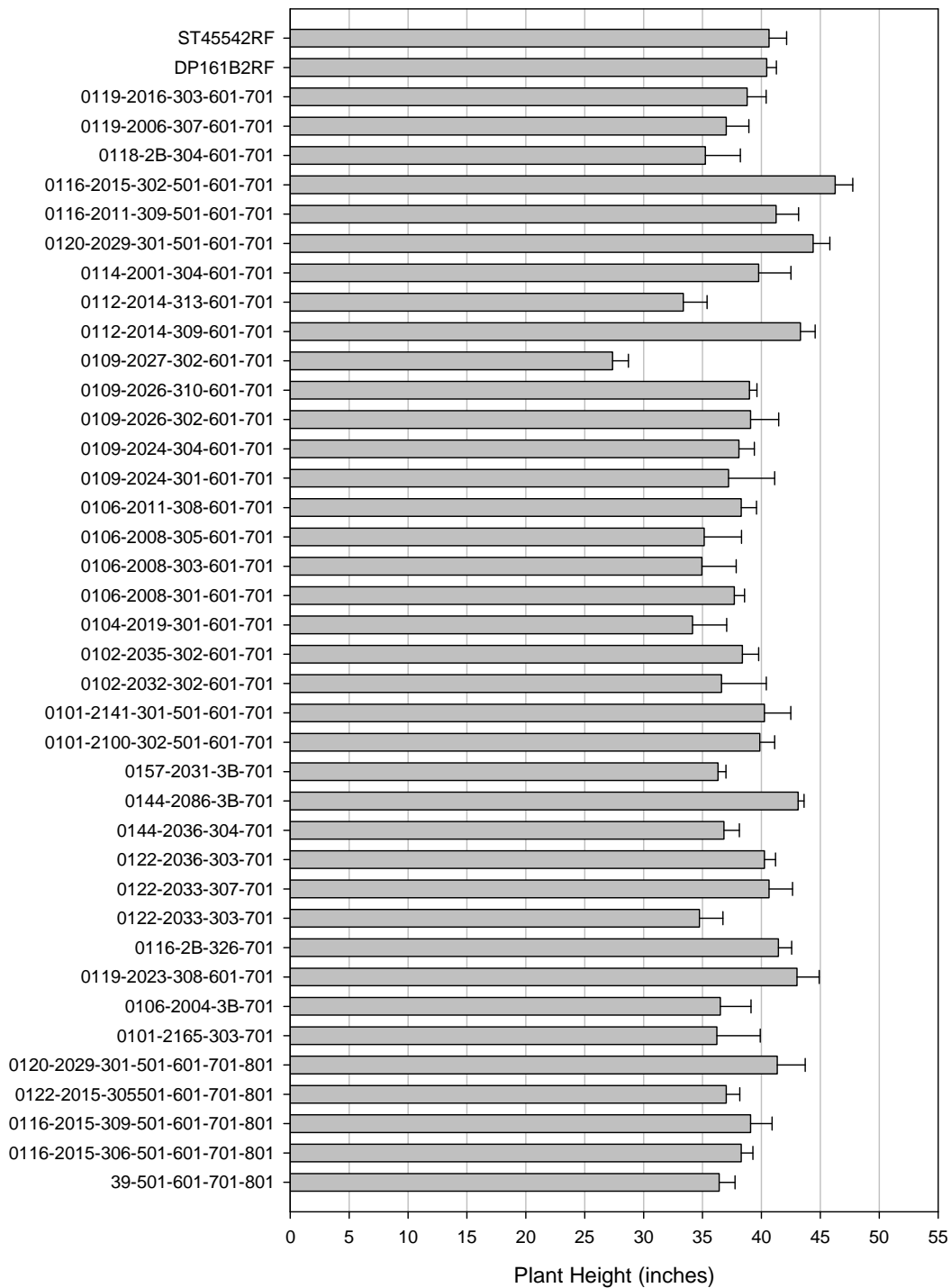
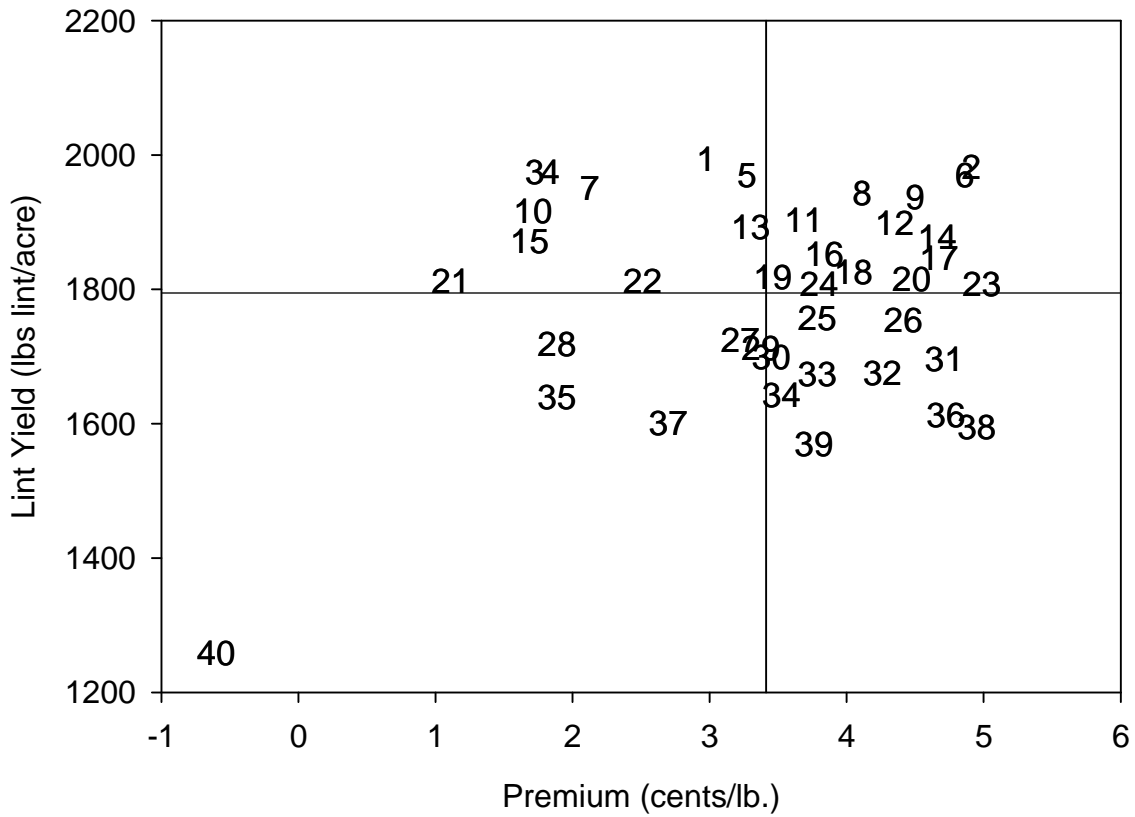


Figure 3. Mean final plant height (inches) along with the standard deviation for each of the ACMA Preliminary and advanced strains evaluated in Maricopa, AZ, 2009.



1 0116-2B-326-701	11 0106-2004-3B-701	21 0104-2019-301-601-701	31 0109-2026-310-601-701
2 39-501-601-701-801	12 DP161B2RF	22 0119-2023-308-601-701	32 0122-2015-305501-601-701-801
3 0122-2033-307-701	13 0120-2029-301-501-601-701-801	23 0118-2B-304-601-701	33 0106-2008-303-601-701
4 0109-2026-302-601-701	14 0122-2033-303-701	24 0109-2024-304-601-701	34 0112-2014-313-601-701
5 0119-2016-303-601-701	15 0116-2015-309-501-601-701-801	25 0157-2031-3B-701	35 0120-2029-301-501-601-701
6 ST45542RF	16 0144-2086-3B-701	26 0101-2100-302-501-601-701	36 0101-2165-303-701
7 0144-2036-304-701	17 0116-2015-302-501-601-701	27 0114-2001-304-601-701	37 0106-2008-301-601-701
8 0119-2006-307-601-701	18 0106-2011-308-601-701	28 0122-2036-303-701	38 0112-2014-309-601-701
9 0116-2011-309-501-601-701	19 0102-2035-302-601-701	29 0101-2141-301-501-601-701	39 0106-2008-305-601-701
10 0109-2024-301-601-701	20 0116-2015-306-501-601-701-801	30 0102-2032-302-601-701	40 0109-2027-302-601-701

Figure 4. Lint yield (lbs/acre) plotted as a function of fiber quality premium/discount (cents/lb). Vertical and horizontal lines represent the mean value for the two parameters. Varieties that fall in the upper right quadrant formed by the mean lines produced higher than average lint yield and fiber quality. Each of the ACGA preliminary and advanced strain entries are plotted for the Maricopa, AZ location in 2009.

Table 4. Yield, fiber quality, and boll weight mean data along with statistical analysis for each of the ACGA preliminary and advanced strains evaluated in Safford, AZ, 2009.

Variety	Variety Identifier	Lint Yield	Means Separation *	Lint Turnout	Boll Weight	HVI Color	Staple 32nds	Strength g/tex	Length Inches	Uniformity Percent	Micronaire	Leaf Grade	Premium cent/lb	Value \$/acre
39-501-601-701-801	ACGA039	1598.7	a	37.2	4.4	31	34	28.9	1.07	80.5	4.9	2	1.9	\$856.58
0116-28-326-701	ACGA246	1570.9	a b	38.0	5.9	31	33	27.9	1.03	80.4	5.2	2	-2.6	\$776.20
0122-2033-307-701	ACGA248	1476.4	a b	35.4	4.6	21	34	29.2	1.06	82.1	4.7	2	1.7	\$791.12
0109-2026-310-601-701	ACGA265	1451.7	a b d	34.8	4.9	21	34	28.0	1.06	79.2	5.0	2	0.7	\$772.21
0116-2015-309-501-601-701-801	ACGA070	1440.0	a b d e	33.3	4.9	31	37	32.7	1.14	81.5	4.9	2	4.1	\$808.09
0122-2033-303-701	ACGA247	1422.9	b d e	36.5	4.1	31	33	27.3	1.03	78.8	4.8	2	-1.5	\$716.95
0102-2035-302-601-701	ACGA256	1396.5	d e f	35.5	4.9	31	34	28.7	1.06	79.9	4.5	2	1.7	\$749.28
0144-2036-304-701	ACGA250	1377.5	d e f	35.7	4.5	31	34	32.4	1.07	81.0	4.7	2	2.2	\$746.69
0106-2004-38-701	ACGA243	1367.5	d e f g	36.6	5.2	31	36	31.6	1.11	81.6	4.8	2	4.8	\$777.33
0120-2029-301-501-601-701	ACGA271	1366.3	d e f g	34.1	4.4	31	35	30.7	1.09	81.3	5.2	2	0.0	\$712.53
0118-28-304-601-701	ACGA275	1341.9	d e f g h	35.9	4.9	31	33	27.6	1.04	80.7	5.0	2	-1.3	\$681.01
0109-2026-302-601-701	ACGA264	1341.8	d e f g h	35.0	4.5	31	35	31.1	1.09	80.2	5.3	2	1.1	\$713.39
0102-2032-302-601-701	ACGA255	1325.7	d e f g h i	33.2	4.6	31	36	33.1	1.11	81.7	5.1	3	2.5	\$721.57
0106-2008-305-601-701	ACGA260	1321.1	d e f g h i	31.8	4.4	21	35	30.5	1.10	79.5	4.4	2	4.6	\$748.07
0109-2024-304-601-701	ACGA263	1304.5	d e f g h i	34.7	4.5	31	35	29.3	1.09	80.1	4.6	2	3.6	\$723.91
0101-2141-301-501-601-701	ACGA254	1303.7	d e f g h i	33.8	5.1	21	33	28.9	1.04	80.6	5.2	2	-2.1	\$651.37
0116-2011-309-501-601-701	ACGA272	1302.1	d e f g h i	35.7	4.9	31	34	28.8	1.05	80.6	4.8	2	1.2	\$694.11
0144-2086-38-701	ACGA251	1297.5	d e f g h i	36.1	4.9	31	35	29.5	1.09	81.5	4.9	2	2.6	\$707.92
0114-2001-304-601-701	ACGA270	1291.8	d e f g h i	33.6	4.4	21	36	31.3	1.13	81.2	4.8	3	5.0	\$736.21
0157-2031-38-701	ACGA252	1289.7	d e f g h i	36.2	5.0	31	34	28.4	1.07	80.6	4.8	3	2.3	\$699.43
0122-2036-303-701	ACGA249	1268.5	e f g h i j	32.2	4.6	31	35	30.7	1.08	80.6	5.2	2	0.9	\$671.40
0122-2015-305501-601-701-801	ACGA078	1266.3	e f g h i j	34.3	5.0	21	35	30.7	1.09	80.6	5.0	2	1.4	\$678.30
0116-2015-306-501-601-701-801	ACGA068	1244.3	f g h i j k	34.2	4.8	21	34	29.5	1.07	80.1	5.0	2	0.5	\$652.12
0116-2015-302-501-601-701	ACGA273	1238.6	f g h i j k	35.2	5.1	31	36	31.6	1.11	82.2	5.1	2	2.5	\$674.42
DP161B2RF	DP161B2RF	1234.7	f g h i j k	33.7	4.1	31	35	29.7	1.10	80.7	4.7	2	4.5	\$697.07
0119-2023-308-601-701	ACGA245	1232.7	f g h i j k	36.2	4.6	21	34	31.1	1.05	81.5	4.9	3	1.2	\$655.75
0101-2100-302-501-601-701	ACGA253	1195.7	g h i j k l	34.9	4.2	21	33	25.9	1.03	78.6	4.9	2	-1.6	\$601.98
0104-2019-301-601-701	ACGA257	1190.0	h i j k l	35.4	4.8	31	35	30.2	1.08	80.6	5.0	2	1.2	\$632.28
0109-2024-301-601-701	ACGA262	1180.0	h i j k l m	36.0	5.2	31	35	30.0	1.08	80.4	5.1	2	1.1	\$627.04
0120-2029-301-501-601-701-801	ACGA082	1172.8	h i j k l m	34.8	4.8	21	35	29.4	1.08	80.3	5.0	2	2.4	\$637.64
0106-2011-308-601-701	ACGA261	1167.8	i j k l m n	34.1	4.3	21	33	28.4	1.02	79.9	4.9	2	-0.6	\$600.00
0119-2006-307-601-701	ACGA276	1159.7	i j k l m n	36.6	4.3	31	35	30.6	1.10	81.7	4.9	2	3.7	\$645.42
0101-2165-303-701	ACGA242	1154.6	i j k l m n	36.2	4.2	21	34	29.0	1.07	79.8	4.2	2	2.2	\$625.48
ST45542RF	ST45542RF	1111.2	j k l m n	34.2	4.6	21	35	29.8	1.09	81.4	4.7	2	3.5	\$616.03
0106-2008-303-601-701	ACGA259	1087.2	k l m n	32.7	4.6	21	36	29.5	1.12	81.4	5.0	2	3.3	\$601.56
0112-2014-313-601-701	ACGA268	1072.1	k l m n	36.9	4.6	21	33	28.8	1.04	80.6	4.5	2	0.7	\$564.27
0106-2008-301-601-701	ACGA258	1026.9	l m n	33.2	5.1	31	36	30.7	1.11	80.8	4.6	2	5.0	\$585.23
0112-2014-309-601-701	ACGA267	1013.4	m n	35.8	5.6	31	34	29.1	1.05	79.8	4.3	2	1.8	\$545.01
0109-2027-302-601-701	ACGA266	995.8	n	32.7	3.9	31	33	28.5	1.03	80.4	4.9	2	0.0	\$518.39
LSD‡		173.9		1.3	0.7	---	1.2	1.6	0.04	1.0	0.3	0.6	3.2	\$99.60
OSL†		0.0001		0.0000	0.0001	---	0.0001	0.0001	0.0001	0.0001	0.0001	0.0039	0.0001	0.0001
CV‡		9.8		2.7	10.1	---	2.6	4.0	2.4	0.9	4.3	19.1	136.8	10.4

*Means followed by the same letter are not statistically different according to a Fisher's least significant difference means separation test.

‡ Least Significant Difference

† Observed Significance Level

‡ Coefficient of Variation

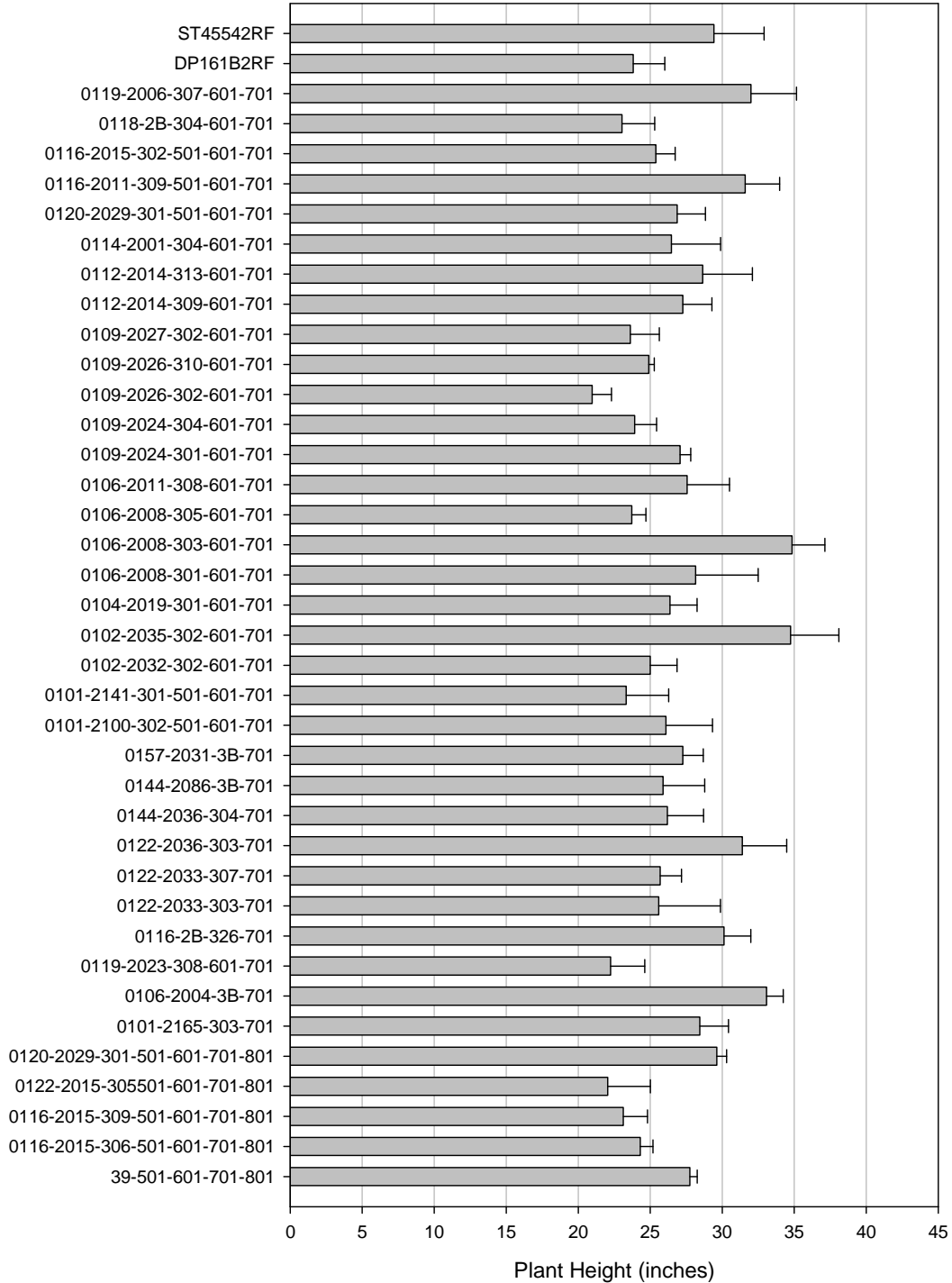
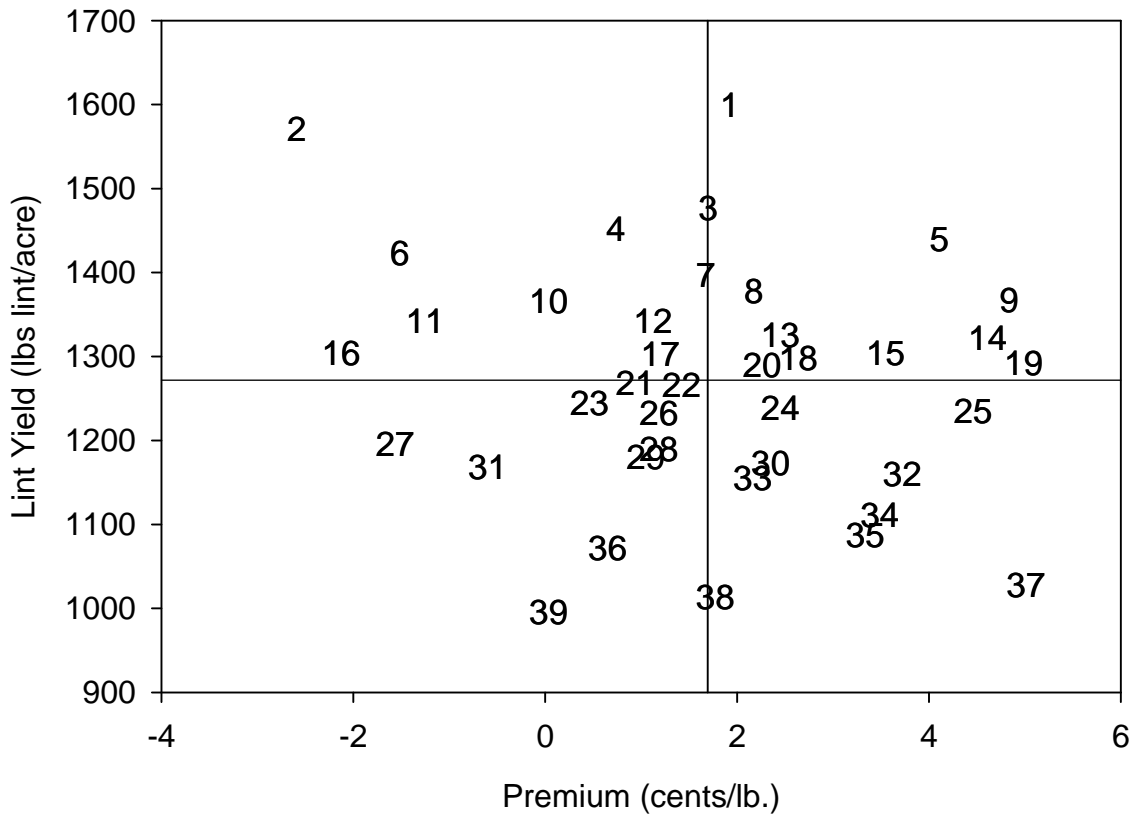


Figure 5. Mean final plant height (inches) along with the standard deviation for each of the ACGA Preliminary and advanced strains evaluated in Safford, AZ, 2009.



1 39-501-601-701-801	11 0118-2B-304-601-701	21 0122-2036-303-701	31 0106-2011-308-601-701
2 0116-2B-326-701	12 0109-2026-302-601-701	22 0122-2015-305501-601-701-801	32 0119-2006-307-601-701
3 0122-2033-307-701	13 0102-2032-302-601-701	23 0116-2015-306-501-601-701-801	33 0101-2165-303-701
4 0109-2026-310-601-701	14 0106-2008-305-601-701	24 0116-2015-302-501-601-701	34 ST45542RF
5 0116-2015-309-501-601-701-801	15 0109-2024-304-601-701	25 DP161B2RF	35 0106-2008-303-601-701
6 0122-2033-303-701	16 0101-2141-301-501-601-701	26 0119-2023-308-601-701	36 0112-2014-313-601-701
7 0102-2035-302-601-701	17 0116-2011-309-501-601-701	27 0101-2100-302-501-601-701	37 0106-2008-301-601-701
8 0144-2036-304-701	18 0144-2086-3B-701	28 0104-2019-301-601-701	38 0112-2014-309-601-701
9 0106-2004-3B-701	19 0114-2001-304-601-701	29 0109-2024-301-601-701	39 0109-2027-302-601-701
10 0120-2029-301-501-601-701	20 0157-2031-3B-701	30 0120-2029-301-501-601-701-801	

Figure 6. Lint yield (lbs/acre) plotted as a function of fiber quality premium/discount (cents/lb). Vertical and horizontal lines represent the mean value for the two parameters. Varieties that fall in the upper right quadrant formed by the mean lines produced higher than average lint yield and fiber quality. Each of the ACGA preliminary and advanced strain entries are plotted for the Safford, AZ location in 2009.