

# 1995 Low Desert Upland Cotton Advanced Strains Testing Program

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## **Abstract**

*Twenty one Upland cotton advanced strains varieties which are not commercially available were evaluated in replicated field studies in 1995 on two farm sites in Queen Creek, Arizona and Buckeye, Arizona representing seven seed companies. Twenty four advanced strains representing eight seed companies were evaluated on a commercial site in Gila Bend, Arizona. Participating seed companies submitted three advanced strain entries, plus a commercially available check of their choice at each site. The Gila Bend site represented strains of a more indeterminate nature for a full season production approach, while the sites at Buckeye and Queen Creek consisted of more determinate entry characteristics to represent a reduced season production approach. The highest lint yields were obtained from Germains 9230 (1756 lb./a), Delta and Pine Land Co. 5517 (1116 lb./a), and Delta and Pine Land Co. 9057 (1578 lb./a) at Queen Creek, Buckeye, and Gila Bend respectively.*

## **Introduction**

Profitable cotton production in the low deserts of Arizona is becoming increasingly challenging due to rapidly rising input costs and cotton prices which are not offsetting the increasing costs. Therefore, it is important that Arizona cotton growers develop the highest level of efficiency in their production systems as possible. Variety selection to maximize yield potential is the first and most important decision a producer makes at season initiation. A major objective of these advanced strains evaluations is to provide additional data to participating seed companies relative to their strains performance under commercial production conditions. Information from these studies contribute to the database for breeder selection of varieties for commercialization which may consistently perform well under the low desert environmental conditions.

## **Materials and Methods**

Twenty one Upland cotton advanced strains representing seven seed companies were tested in 1995 on two commercial cooperator sites in Queen Creek, Arizona and Buckeye, Arizona. Participating seed companies submitted three entries plus a commercially available check of their choice at each test site. Twenty four Upland cotton advanced strains representing eight seed companies plus a commercial check of their choice were evaluated at a commercial cooperator site in Gila Bend, Arizona. Strains selection of a more determinate nature were evaluated in Queen Creek and Buckeye while selections of materials of a more indeterminate nature were evaluated in Gila Bend (Table 1).

Plots were four rows wide (38in.) and 38 feet long in Queen Creek and six rows wide (38 in.) and 38 feet long in Buckeye and Gila Bend. Plots were dry planted using cone planters and irrigated up on April 6, April 4, and April 10, 1995 in Queen Creek, Buckeye, and Gila Bend, respectively. Due to possible differences in germination tendencies, a seeding rate of fifteen pounds per acre was used. After stand establishment was complete, all plots were hand thinned to a targeted uniform population of 40,000 plants per acre on May 17, May 16, and May 11, 1995 in Queen Creek, Buckeye, and Gila Bend respectively.

Detailed plant mapping measurements were made approximately every two weeks at the Buckeye and Gila Bend sites. The experiment at Queen Creek was not mapped due to repeated extensive terminal loss, and resultant difficulties in plant mapping. Measurements included plant height, number of mainstem nodes, height:node ratios, and fruit retention.

The experiments were harvested on November 8, October 23, and November 9, 1995 in Queen Creek, Buckeye, and Gila Bend respectively. Seed cotton yields were measured by mechanically harvesting the center two rows of each plot with a modified cotton picker with a bagging attachment. Weights were measured using a tri-pod and a hanging electronic scale to weigh the seed cotton from each plot. Prior to mechanical harvest, all bolls on five plants in non-yield rows were hand harvested. These subsamples were ginned to determine lint percent. Final lint yields were then calculated on a per acre basis. Each fiber sample from the ginning process was submitted to the USDA Cotton Classing Office in Phoenix, Arizona for grades and HVI fiber quality analysis (Tables 3, 5, 7).

## **Results**

Statistical data analysis was accomplished using SAS PROC GLM (SAS Institute Inc., 1989). Final lint yields ranged from a high of 1756 lb./acre (GC9230) to a low of 1157 lb./acre (HX94513) at the Queen Creek site. Final lint yields at the Buckeye site ranged from a high of 1116 lb./acre (DPX5517) to a low of 528 lb./acre (SGX9396). Final lint yields at the Gila Bend site ranged from a high of 1612 lb./acre (GC9230) to a low of 997 lb./acre (OA59). Significant range in lint yields were observed at all sites (Tables 2, 4, 6)

It should be noted that the relatively low yields at the Buckeye site were most likely due to severe early season cold stresses encountered during the germination and stand establishment period. This experiment was planted and irrigated up just prior to the extreme cold period experienced from approximately April 11 through April 20. Stand loss due to seedling disease was quite high but stabilized at an acceptable plant population. However, it is felt that the plants at the Buckeye site experienced an enormous degree of early season chilling which affected season long vigor and ultimate yield performance.

Upon review of the data presented in this report, it is readily apparent that the breeding programs of participating companies have attempted to address the future changing needs of the Arizona cotton industry in a progressive and regionally adaptive manner.

## **Acknowledgements**

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## **Literature Cited**

SAS Institute Inc., SAS/STAT<sup>®</sup> User's Guide, Version 6, Fourth Edition, Volume 2, Cary, NC: SAS Institute Inc., 1989. 846 pp.

Table 1. Seed Companies and Varieties Submitted for the Low Desert Upland Cotton Advanced Strains Testing Program	
<u>CHEMBRED</u> CB 477 CB 466 CB 620 CB 232 (Check)	<u>J &amp; S RESEARCH</u> JSX16 JSX22 JSX10 JSX11 JSX21 HS 44 (Check)
<u>DELTA &amp; PINE LAND CO.</u> DPX 5517 DPX 9050 DPX 9057 DPL 5415 (Check)	<u>O &amp; A RESEARCH</u> OA-7 OA-36 OA-59
<u>GERMANS</u> GC 9230 GC 9231 GC 9321 GC 210 (Check)	<u>SURE GROW</u> SGX93253 SGX93-180 SGX93248 SGX9396 SUREGROW 125 (Check)
<u>HARTZ</u> HX 03392 HX 3368-69 HX 96253 HX 625 HX 3407 HX 06498 HX 94-513 H 1560 (Check) H 1244 (Check) H 1277 (Check)	<u>TERRA</u> T 292 T 366 T 21197 C40 (Check)

Table 2. Upland Cotton 1995 Advanced Strains Field Studies, Queen Creek, Az.  
Seed Cotton / Acre, Lint Percent, and Lint / Acre.

Entry	Seed Cotton/Acre	Lint %	Lint/Acre
GC 9230	4622 a <sup>a</sup>	38.0	1756 a
T 21197	4339 a b	33.5	1453 b c d e f
SGX 9396	4299 a b	36.4	1565 a b
CB 232	4230 a b	34.9	1476 b c d e f
SGX 93180	4164 a b c	37.3	1553 a b c
C 40	4117 a b c	36.7	1511 b c d e
DPL 5415	4115 a b c d	37.3	1535 a b c d
DPX 9057	4064 a b c d e	36.7	1492 b c d e
SG 125	4035 a b c d e	37.9	1529 b c d e
JSX 22	4010 b c d e f	35.8	1436 b c d e f g
T 292	4004 b c d e f	33.4	1338 d e f g h i j
SG 501	3835 b c d e f g	35.9	1377 b c d e f g h i
SGX 93253	3824 b c d e f g	36.7	1404 b c d e f g h
CB 477	3784 b c d e f g h	35.8	1355 b c d e f g h i j
DPX 5517	3778 b c d e f g h	37.5	1417 b c d e f g h
HS 44	3720 b c d e f g h	35.1	1339 c d e f g h i j
GC 210	3692 b c d e f g h	36.8	1359 b c d e f g h i j
DPL 5432	3540 c d e f g h	36.1	1278 e f g h i j
GC 9231	3488 d e f g h	36.0	1256 f g h i j
HX 96253	3458 d e f g h	36.3	1255 f g h i j
T 366	3440 e f g h	35.0	1204 h i j
HX 625	3421 f g h	37.1	1269 f g h i j
JSX 16	3411 f g h	35.8	1221 g h i j
DPX 9050	3393 g h	37.5	1272 f g h i j
CB 466	3358 g h	36.1	1212 h i j
H 1244	3329 g h	37.5	1248 f g h i j
HX 94513	3317 g h	34.9	1157 j
JSX 10	3186 h	36.6	1166 j
CB 620	3177 h	36.8	1169 j
GC 9321	3175 h	37.5	1191 i j

<sup>a</sup>Means followed by the same letter are not significantly different at the 5% probability level SAS PROC GLM (Seed Cotton MSE=170009.4, T=1.989, C. V.=9.50; Lint MSE=16111.8, T=1.989, C. V.=9.50).

Table 3. Upland Cotton Advanced Strains 1995, Queen Creek, AZ, Fiber Quality.

Entry	Grade	Micronaire	Length	Staple	Strength
C 40	41(1)	45	114	37	29.1
CB 232	n/g <sup>a</sup>	40	117	38	28.6
CB 466	41(1)	42	116	37	31.9
CB 477	31(1)	44	116	37	32.4
CB 620	41(1)	40	115	37	28.9
DPL 5415	41(1)	47	117	37	30.3
DPL 5432	31(1)	42	122	39	32.1
DPX 5517	n/g	43	118	38	32.2
DPX 9050	31(1) 41(1)	44	116	37	31.5
DPX 9057	n/g	43	117	37	31.5
GC 210	31(1)	44	119	38	30.2
GC 9230	31(2)	44	117	37	31.4
GC 9231	n/g	46	114	37	32.4
GC 9321	n/g	37	118	38	29.2
H 1244	31(1)	41	114	37	30.5
HS 44	31(1) 41(2)	47	119	38	33.2
HX 625	n/g	43	111	36	28.8
HX 94513	31 (1) 41(1)	42	114	37	29.1
HX 96253	41(1)	43	117	37	29.1
JSX 16	41(1)	48	115	37	32.3
JSX 22	31(2)	44	118	38	31.8
SG 125	31 (1) 41(1)	45	116	37	28.2
SG 501	31(1)	46	118	38	32.3
SGX 93180	41(2)	46	116	37	27.8
SGX 93253	41(1)	47	116	37	30.6
SGX 9396	31(2) 41(2)	46	115	37	30.7
T 21197	31(1) 41(1)	43	115	37	28.7
T 292	31(2) 41(2)	40	116	37	27.9
T 366	31(1) 41(1)	40	117	38	27.8

<sup>a</sup>n/g = No grades available from Classing Office.

Table 4. Upland Cotton 1995 Advanced Strains Field Studies, Buckeye, AZ, Seed Cotton / Acre, Lint Percent, and Lint / Acre.

Entry	Seed Cotton/Acre	Lint %	Lint/Acre
DPX 5517	2930 a <sup>a</sup>	38.1	1116 a
JSX 16	2843 a b	39.0	1109 a b
JSX 10	2810 a b	38.9	1093 a b
HS 44	2736 a b c	37.7	1032 a b c
CB 477	2723 a b c	37.5	1021 a b c d
GC 9230	2600 a b c d	36.2	959 a b c d e
DPX 9050	2385 a b c d e	37.3	890 b c d e f
SG 501	2376 a b c d e	37.6	894 b c d e f
DPL 5432	2363 a b c d e	36.7	867 b c d e f g
GC 9231	2349 a b c d e f	36.7	862 b c d e f g h
JSX 22	2329 a b c d e f g	37.2	866 b c d e f g
T 366	2324 b c d e f g	36.0	837 c d e f g h i
T 21197	2216 c d e f g h	37.7	835 c d e f g h i
DPX 9057	2206 c d e f g h	37.0	816 c d e f g h i
H 1277	2179 c d e f g h i	36.6	797 d e f g h i j
HX 06498	2168 c d e f g h i	36.6	794 d e f g h i j k
CB 466	2073 d e f g h i	36.1	749 e f g h i j k
SGX 93253	2070 d e f g h i	37.2	770 e f g h i j k
CB 620	2040 d e f g h i j	38.1	777 d e f g h i j k
T 292	2039 d e f g h i j	36.4	742 e f g h i j k l
DPL 5415	2011 e f g h i j	36.7	738 e f g h i j k l
GC 210	1984 e f g h i j	36.4	722 f g h i j k l
CB 232	1931 e f g h i j	37.8	730 e f g h i j k l
SGX 93180	1901 e f g h i j	37.5	713 f g h i j k l
HX 3407	1721 f g h i j	37.2	640 g h i j k l
GC 9321	1666 g h i j	37.5	624 h i j k l
HX 94513	1638 h i j	37.9	621 i j k l
SG 125	1620 i j	35.6	577 k l
C 40	1599 i j	36.6	585 j k l
SGX 9396	1449 j	36.4	528 o l

\*Means followed by the same letter are not significantly different at the 5% probability level SAS PROC GLM (Seed Cotton MSE=170212.8, T=1.990, C. V.=18.97; Lint MSE=23927.8, T=1.990, C. V.=19.13).

Table 5. Upland Cotton Advanced Strains 1995, Buckeye, AZ, Fiber Quality.

Entry	Grade	Micronaire	Length	Staple	Strength
C 40	11(2) 21(1) 31(1)	51	105	34	27.4
CB 232	21(4)	50	106	34	27.3
CB 466	11(3) 21(1)	51	108	35	27.4
CB 477	21(3) 31(1)	52	110	35	28.7
CB 620	11(1) 21(2) 31(1)	49	108	35	26.8
DPL 5415	11(1) 21(3)	53	107	34	28.5
DPL 5432	21(4)	50	113	37	29.5
DPX 5517	11(1) 21(3)	54	110	35	30.3
DPX 9050	11(1) 21(3)	53	110	35	30.3
DPX 9057	21(4)	54	108	35	28.8
GC 210	11(1) 21(3)	50	108	35	28.7
GC 9230	21(4)	52	107	34	28.5
GC 9231	21(4)	55	109	35	30.2
H 1277	21(4)	46	105	34	25.8
HS 44	11(1) 21(3)	56	108	35	28.2
HX 06498	21(4)	49	104	34	25.7
HX 3407	11(2) 21(1) 31(1)	54	104	33	28.1
HX 94-513	21(4)	50	105	34	25.9
JSX 10	21(4)	56	100	32	29.8
JSX 16	21(4)	55	107	35	28.8
JSX 22	11(1) 21(3)	52	113	36	29.8
SG 125	11(1) 21(3)	49	104	33	26.2
SG 501	21(4)	53	110	35	31.4
SGX 93-180	11(3) 21(1)	48	107	35	28.5
SGX 93253	21(4)	53	105	33	28.1
SGX 9396	11(1) 21(3)	50	107	34	27.7
T 21197	11(1) 21(3)	49	106	34	26.0
T 292	11(1) 21(3)	49	109	35	26.4
T 366	11(3) 21(1)	52	109	35	26.4

Table 6. Upland Cotton 1995 Advanced Strains Field Studies, Gila Bend, AZ,  
Seed Cotton, Lint Percent, and Lint / Acre.

Entry	Seed Cotton/Acre	Lint %	Lint/Acre
DPX9057	4471 a*	35.3	1578 a b
GC 9230	4453 a b	36.2	1612 a
JSX 21	4359 a b c	34.5	1504 a b c
OA 36	4356 a b c	35.8	1560 a b
DPX 5517	4209 a b c d	35.4	1490 a b c
OA 7	3987 a b c d e	36.1	1439 a b c d e
HS 44	3970 a b c d e	35.0	1393 b c d e f
CB 232	3946 b c d e	36.9	1456 a b c d
GC 9231	3937 b c d e	36.1	1421 a b c d e
DPX 9050	3905 c d e f	36.5	1425 a b c d e
JSX 10	3896 c d e f	35.4	1379 c d e f
JSX 11	3888 c d e f	36.8	1431 a b c d e
DPL 5415	3881 c d e f	36.7	1424 a b c d e
SGX 93248	3861 c d e f g	35.2	1359 c d e f g
SGX 93180	3855 d e f g	37.2	1434 a b c d e
CB 466	3782 d e f g	35.9	1358 c d e f g
HX 336869	3739 e f g h	36.3	1357 c d e f g
CB 477	3658 e f g h i	35.7	1306 d e f g h
SG 125	3616 e f g h i	35.8	1294 d e f g h
CB 620	3613 e f g h i	35.7	1290 d e f g h
H 1560	3613 e f g h i	33.8	1221 f g h i
GC 210	3541 e f g h i j	35.2	1247 e f g h i
HX 03392	3506 e f g h i j	36.2	1269 e f g h i
T 21197	3498 e f g h i j	35.8	1252 e f g h i
C 40	3367 f g h i j k	35.1	1182 g h i j
SGX 93253	3349 g h i j k	35.4	1185 g h i
T 292	3232 h i j k	35.7	1154 g h i j
T 366	3188 i j k	35.7	1138 h i j
GC 9321	3050 j k	36.1	1101 i j
HX 94513	2989 k	37.1	1109 i j
OA 59	2906	34.3	997 j

\*Means followed by the same letter are not significantly different at the 5% probability level SAS PROC GLM (Seed Cotton MSE=125578.7, T=1.989, C. V.=9.50; Lint MSE=170009.4, T=1.989, C. V.=11.05).



Table 7. Upland Cotton Advanced Strains 1995, Gila Bend, AZ, Fiber Quality.

Entry	Grade	Micronaire	Length	Staple	Strength
C 40	31(3)	47	113	36	26.8
CB 232	31(1) 41(2) 51(1)	49	111	36	28.7
CB 466	31(1) 41(3)	48	112	36	27.8
CB 477	31(1) 41(2) 51(1)	49	109	35	28.7
CB 620	31(2) 41(2)	47	112	36	27.8
DPL 5415	31(2) 41(2)	49	110	36	28.9
DPX 5517	31(1) 41(3)	49	111	36	28.8
DPX 9050	41(3) 51(1)	48	110	35	26.9
DPX 9057	41(3) 51(1)	45	110	36	28.7
GC 210	41(2) 51(1)	46	109	35	27.6
GC 9230	41(3) 51(1)	46	112	36	28.0
GC 9231	31(1) 41(2) 51(1)	50	113	36	30.5
H 1560	41(3)	48	112	36	27.6
HS 44	31(1) 41(1) 51(1)	48	111	36	27.8
HX 03392	31(1) 41(2) 51(1)	52	111	36	27.4
HX 336869	41(3) 51(1)	52	111	36	29.5
HX 94513	41(2) 51(2)	51	110	35	29.5
JSX 10	41(3) 51(1)	49	111	36	27.8
JSX 11	41(2) 51(2)	49	113	36	30.2
JSX 21	31(2) 41(1) 51(1)	52	109	35	29.7
OA 36	41(2) 51(2)	48	110	35	28.3
OA 59	31(1) 41(2) 51(1)	50	113	37	30.5
OA 7	33(1) 41(2) 51(1)	50	110	36	27.9
SG 125	31(1) 41(3)	49	112	36	29.2
SGX 93180	31(1) 41(3)	48	110	35	28.2
SGX 93248	41(3) 51(1)	47	110	35	28.0
SGX 93253	31(2) 41(2)	48	109	35	27.5
T 21197	31(2) 41(1) 51(1)	49	112	36	29.9
T 292	31(3) 41(1)	47	112	36	27.3
T 366	31(1) 41(1) 51(2)	48	111	36	29.3