

Short Staple Cotton Advanced Strains Trial, Safford Agricultural Center, 1995

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Abstract

Sixteen short staple advanced strains/varieties were grown in a replicated field on the Safford Agricultural Center in 1995. These included entries from ChemBred, Delta Pine, Sure-Grow, Olvey and Associates, McDaniels, NMSU and Australia. The Australian materials produced quite well with three of the entries placing in the top four with respect to lint yield. The highest yielding cultivar being an Australian entry, A83203-183, with a yield of 1508.5 pounds of lint per acre. In addition to yield data, this report includes many agronomic parameters including seedling vigor index, height to node ratio, and boll size. HVI analyses are also included in the report.

Introduction

Over the years, the short staple variety trial on the Safford Agricultural Center has grown from a dozen varieties to more than fifty. Advanced strain and registered varieties were grown and compared together with some local standards. This trial has now split into two parts which are the regional trial and this advanced strains trial. Local standards will be maintained in this trial so the results can be compared to the regional trial. The main objective of this trial is to screen advanced strains so the strongest can be selected and developed as registered varieties. By cooperating with and encouraging breeders to work at this elevation, we hope to strengthen the varieties available for the southeastern part of Arizona, and parts of New Mexico and Texas with similar climates.

Materials and Methods

This trial was designed as a replicated small plot trial with five replications. The plots were planted with a cone-type planter which distributes a given weight of seed uniformly over the length of the plot. After planting, the plots were irrigated to produce uniform germination and emergence. The following crop history provides the information on how the crop was managed:

Crop History:

Previous crop: Cotton

Soil type: Grabe clay loam/Pima clay loam variant

Planting date: 20 April 1995 Rate: 25 pounds per acre

Herbicide: Prometryne at lay-by

Fertilizer: 46 pounds of N per acre, side dressed on 9 June and 10 July

Insecticide: 3 applications to control stink bugs, pinkie and aphids.

Pix/Prep: None

Defoliation: Ginstar

Irrigation: Furrow, watered up + 7 irrigations (ca. 33.8 inches + 4.6 inches of rain)

Harvest dates: 1st pick: 30 October 2nd pick: 22 November

Heat units per growing season: 3703 (86/55)

On 10 May stand counts were made in two of the reps, these values were divided by the mean value and expressed as a percent as an indication of seedling vigor. Plots were picked with an IH 782 picker modified for small plot use. Plots were picked individually, weighed and grab samples taken for percent lint turnout and fiber analysis.

Results and Discussion

Even though the weather at planting time was much less than ideal, our planting date was followed by a warming trend that permitted reasonable stand establishment. Table 1 shows the final plant population of each cultivar tested and indicates no significant differences between entries. The seedling vigor index is shown in Table 2 with many differences between cultivars. A very highly positive correlation was found between seedling vigor and lint yield ($p=0.003$, $r=0.325$). Average yields in the trial were higher than in last year's trial but the highest yield was slightly lower (1). The Australian entry, A83203-183, was the highest yielding entry with a yield over 3 bales per acre. It was followed closely by two other Australian varieties, a ChemBred experimental and DP 90. DP 90 was included in the trial as a local standard for comparison. The percent first pick column is used as an indicator of maturity and from that, it is deduced that the four Australian entries, DPX 9050 and MAC 95 are all slightly longer seasoned cultivars than DP 90. An interesting negative correlation was seen between percent first pick and lint yield ($p=0.015$, $r=-0.271$). This indicates that yield decreased as percent first pick decreased (or length of season required for maturity increased). The shortest seasoned entries, CBX 466, OA 59 and SGX 93126, however, yielded under the average.

Looking at height to node ratio (HNR) and boll size on Table 2, some differences are seen. The wilt resistant line from New Mexico had the largest bolls followed closely by SGX 247, the highest yielding entry in the 1994 study, and another SG experimental. It was found that boll size (weight) negatively correlated with percent lint turnout ($p=0.0006$, $r=-.037$). This would indicate that heavier bolls were heavier because of increased seed size and weight.

Table 3 shows the HVI values of each entry in the trial. A statistical analysis was not done on the data because of time constraints, but interesting information can be gleaned from the table. Compared to last year, this year's fiber was longer, more uniform, similar strength, more elongation and finer (lower micronaire). Entries with exceptional fiber length were NM Wilt Adv, Siokra L23, SGX 93207, OA 59 and CS 198+ (Australian). These entries also had good fiber strength, with the New Mexico entry having the greatest strength. The most exciting part is the average from these entries indicates longer and finer fiber than seen in our previous years studies (references 1 and 2) and from this year's short staple regional variety trial (3).

References

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3. Clark, L.J., E.W. Carpenter, G.L. Hart and J.M. Nelson. 1996. Short staple regional variety trial, Safford Agricultural Center, 1995. Cotton, A College of Agriculture Report, The University of Arizona, Tucson, AZ. In this issue

Acknowledgments

Appreciation is expressed to the many seed companies that contributed seed and financial assistance to make this trial a success.

Table 1. Yields and other agronomic data from the upland cotton advanced strains trial grown on the Safford Agricultural Center, 1994.

Variety	SC Yield	% Lint	Lint Yield	% 1st Pick	PI Hta	PI/ac
A83203-183	3775.2 a ¹	39.8 a	1508.5 a	76.7 c-e	31.0 a	31763 a
CS 189	3816.7 a	38.6 b	1475.9 a	78.6 b-e	33.8 a	29948 a
CBX 477	3920.4 a	37.4 bc	1469.2 a	81.2 a-e	31.1 a	30129 a
CS 189+	3941.1 a	37.3 bc	1468.3 a	74.5 de	30.5 a	28314 a
DP 90	3891.3 a	37.2 bc	1447.2 a	81.8 a-d	32.9 a	26681 a
SGX 247	3650.7 a	37.5 bc	1369.2 ab	81.3 a-e	31.9 a	33759 a
SIOKRA L23	3671.5 a	36.6 c	1343.4 ab	73.9 de	32.7 a	33215 a
SGX 93108	3621.7 a	36.4 c	1317.9 abc	84.7 abc	33.6 a	36482 a
OA 7	3538.7 ab	37.0 bc	1308.7 abc	81.2 a-e	31.3 a	31581 a
DPX 9050	3347.9 abc	37.8 bc	1265.9 abc	73.1 e	30.0 a	35756 a
SGX 93207	3157.1 abc	37.8 bc	1192.9 a-d	84.2 abc	32.6 a	33578 a
MAC 95	3406.0 abc	34.4 d	1172.8 a-d	73.6 de	33.9 a	36663 a
CBX 466	3314.7 abc	34.9 d	1154.5 a-d	88.0 a	31.3 a	36845 a
SGX 93126	3040.9 abc	34.7 d	1056.1 b-d	86.0 ab	32.0 a	32307 a
OA 59	2663.4 bc	36.6 c	974.5 cd	87.0 ab	31.9 a	33759 a
NM Wilt Adv	2626.0 c	33.8 d	890.6 d	82.9 abc	30.7 a	31581 a
Average	3461.5	36.7	1276	80.54	31.95	32647.3
LSD(05)	575	1.1	224.7	5.24	3.31	6801
CV(%)	13.1	2.38	13.9	5.14	8.19	16.5

1. Values followed by the same letter within a column are not significantly different at the 5% level of probability.

Table 2. Other agronomic variables measured or calculated from the upland cotton advanced strains study on the Safford Agricultural Center, 1995.

Variety	Vigor	Nodes per plant	Height to Node Ratio	Boll size (grams/boll)
A83203-183	121.9 ab ¹	21.3 a	1.46 a	4.28 f
CS 189	76.8 bc	21.1 a	1.60 a	4.54 cdef
CBX 477	120.6 ab	19.0 a	1.64 a	4.79 cde
CS 189+	131.0 a	20.9 a	1.47 a	4.73 cdef
DP 90	90.3 ab	20.5 a	1.61 a	4.85 c
SGX 247	99.4 ab	21.4 a	1.50 a	5.55 a
SIOKRA L23	101.6 ab	19.9 a	1.67 a	4.76 cde
SGX 93108	103.9 ab	20.8 a	1.63 a	5.33 ab
OA 7	128.7 a	20.5 a	1.54 a	4.75 cdef
DPX 9050	108.4 ab	21.8 a	1.38 a	4.34 ef
SGX 93207	79.1 bc	21.3 a	1.53 a	4.37 def
MAC 95	94.9 ab	21.1 a	1.61 a	4.83 cd
CBX 466	108.4 ab	22.4 a	1.40 a	4.94 bc
SGX 93126	94.9 ab	20.9 a	1.53 a	4.72 cdef
OA 59	49.7 c	21.6 a	1.48 a	4.90 bc
NM Wilt Adv	90.3 ab	20.8 a	1.48 a	5.66 a
Average	100.0	20.95	1.53	4.83
LSD(05)	27.8	2.0	0.2	0.4
CV(%)	22.0	7.5	11.0	6.7

1. Values followed by the same letter within columns are not significantly different at the 5% level of probability.

Table 3. HVI data from the upland cotton advanced strains trial grown on the Safford Agricultural Center, 1995.

Variety	Length (inches)	Uniformity	Strength (g/Tex)	Elongation	Micronaire	Grade
A83203-183	1.18	82.5	31.1	9.8	4.3	21/31
CS 189	1.18	83.7	29.4	10.5	4.4	21/31
CBX 477	1.16	83.2	29.6	9.9	4.5	21/31
CS 189+	1.20	83.8	31.9	9.9	4.6	31
DP 90	1.14	83.3	30.1	9.7	4.4	31
SGX 247	1.19	83.7	29.1	9.7	4.4	31
SIOKRA L23	1.22	83.7	31.1	9.9	4.0	31
SGX 93108	1.17	83.9	28.1	10.0	4.6	31
OA 7	1.15	84.6	31.6	9.8	4.4	31
DPX 9050	1.18	83.3	30.1	9.9	4.2	31
SGX 93207	1.21	84.3	29.5	9.9	4.4	31
MAC 95	1.18	82.5	31.1	9.8	4.3	21/31
CBX 466	1.18	84.1	27.7	10.5	4.6	21/31
SGX 93126	1.18	83.6	28.4	10.5	4.5	21/31
OA 59	1.20	83.3	30.1	9.8	4.2	41
NM Wilt Adv	1.23	84.4	33.7	9.5	4.3	31
Average	1.18	83.62	30.16	9.94	4.38	
Std Dev	0.02	0.6	5.29	1.42	0.86	