Cotton Variety Trial, Safford Agricultural Center, 1991

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Abstract

Forty one short staple varieties and Pima S-6 were grown in a replicated field trial on the Safford Agricultural Center in Graham county. Most of the varieties were commercially available in the cotton belt, however, a few experimental varieties from the New Mexico acalas, ChemBred and from Delta Pines were included. Yields were 15 to 30% lower than the yields in this trial in 1990, with only one variety producing more than 4000 pounds of seed cotton per acre. The top variety was CB (ChemBred) 407 with a yield of 4177 pounds per acre. HS Sal 10, which was number two last year, retained that position in 1991. Newcomers to the top ten were: S1001, HS 46, CBX 1210, DP 5690, STV 506 and DP 5415.

Heat unit data from the past couple of years are given in this report along with the average heat unit accumulation.

Introduction

Over the years, changing to a new variety has been the most productive means of increasing cotton yields throughout the cotton belt. Generally a variety will be in use for around 7 years and then be replaced by a variety that will yield around 10% more than it did. Several new varieties are included in this test, acalas from New Mexico, California and Delta Pine, hybrids from ChemBred and the Nazas variety from Mexico. Five Multi-Adversity Resistant (MAR) varieties from Texas A&M were also included in the test.

This trial is a replicated, small plot, variety test designed to screen a large number of short staple and acala cotton varieties before they are taken to farmers fields for further testing.

Materials and Methods

The following crop history provides the essential details on how the test plots were managed.

Crop History:
Soil type: Pima silty clay variant/ Grabe clay loam
Previous crop: Barley
Tillage: Ripped, disced, and bedded
Planting: Date: 26 April 1991 Rate: 25 pounds per acre
Herbicide: Trifluralin preplant incorporated
Fertilizer: 200 pounds per acre 16-20-0 preplant
100 pounds per acre Urea side dressed on 28 May
100 pounds of N side dressed on 24 Jul

Irrigation: Irrigated up and 7 irrigations (ca. 36 ac inches)
Plot size: 50 feet long, 2 -36 inch beds wide
Defoliation: DROPP and PREP
Harvest: First pick: 29 October
Second pick: 20 November
Heat units per growing season: 3574 (86/55, sine curve)

The plots were planted with a cone planter, which delivered the same volume of seed to each plot, so the final plant populations were affected by both seed size and seedling vigor.

The plots were picked with a modified 2-row cotton picker. The cotton from each plot was caught in a sack and weighed on hanging scales. Sub samples were taken to determine percent lint turnout and lint quality.

Results and Discussion

The results of the test are found in Table 1. ChemBred's CB 407 was the top yielding cultivar in the test but yielded more than 700 pounds less than the highest yielding variety in 1990 (1). Delta Pine's 5690, which will replace DP 90 in some areas, grew and produced much the same as DP 90 in this test, except being slightly taller. Similar results for DP 5690 were seen in the Colvin test in Graham county (2). Both HS Sal 10 and S1001 yielded very well in this test but did not fare so well in the Colvin test. CB 1135, an acala quality cotton from ChemBred, produced more cotton than the New Mexico and California acalas. In the Greenlee county tests, it performed quite well (3).

The multi-adversity resistant cotton varieties from Texas A&M were not well adapted to our area and yielded significantly less than all the other varieties.

Pima S-6 performed much poorer in 1991 than in 1990, yielding 30% less compared with 15% less for DP 90. The average yield of the test was 74.1% of the average yield for 1990 and the plants were 86.8% of the height of the plants in 1990. The number of heat units received during the growing season was slightly more than in 1990, but the 1990 yields were superior to this year's yields. This points out that the total heat unit count doesn't tell the whole story. Figure 1 shows the heat units in 1991 compared with the average. The average number of heat units received between the first of April and the end of October is 3714. For that same period in 1991, 3831 heat units were received. The great variability in heat units from day to day makes it a bit hard to tell what happened, even though one can see more heat units than average in mid summer and in late September and less than average in the spring. To simplify the graph, 15 days were averaged together in each point in Figure 2 and the average is subtracted from each point. The past three years are plotted on this graph showing the differences from the average for each year. In this figure it can be seen that heat units were lacking in mid April and from the last part of May through the month of June. The remainder of the season was above average, which helped the crops catch up, but the hard frost on the 29th of October terminated the season before the longer season varieties, such as Pima S-6, finished out their crop.

References

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2. Clark, Lee J. and Ronald E. Cluff. 1992. Short Staple Variety Demonstration, Graham County, 1991. Cotton, A College of Agriculture Report, The University of Arizona, Tucson. In this volume.

3. Clark, Lee J. and Mike Schneider. 1992. Cotton Variety Trials, Greenlee County, 1991. Cotton, A College of Agriculture Report, The University of Arizona, Tucson. In this volume

Table 1. Yield, percent first pick, plant height and population of short staple varieties grown on the Safford Agricultural Center, 1991.

Variety	SC Yield[1]	Percent 1st Pk	Plant Height[2]	Plant Population
CB 407	4176.7 a[3]	97.0 a-d	33.5 ab	50372 abc
HS SAL 10	3994.5 ab	97.7 a	32.1 ab	54683 abc
S1001	3909.3 abc	97.5 ab	32.6 ab	46969 abc
HS 46	3718.9 a-d	96.4 a-d	32.3 ab	47422 abc
CBX 1210	3707.8 a-e	96.8 a-d	32.3 ab	48784 abc
DP 90	3635.9 a-f	97.0 a-d	30.8 ab	49238 abc
DP 5690	3622.6 a-f	97.4 a-c	31.9 ab	52641 abc
KC 311	3501.1 a-g	96.2 a-d	31.3 ab	49691 abc
STV 506	3467.0 b-g	96.6 a-d	32.3 ab	49238 abc
DP 5415	3429.2 b-h	97.4 a-c	32.9 ab	45607 abc
DP 2833-489	3392.9 b-i	97.8 a	33.0 ab	36758 c
CBX 1211	3367.8 b-j	96.6 a-d	32.3 ab	43792 abc
CB 7	3281.8 c-k	95.6 a-d	33.1 ab	51280 abc
DP 8426-5B	3232.6 c-l	97.5 ab	31.1 ab	39345 bc
CB 219	3216.6 c-m	97.3 a-c	30.5 ab	45380 abc
CB 1135	3079.6 d-n	98.0 a	29.6 b	47195 abc
HARTZ 1416	3022.2 d-n	97.5 ab	30.4 ab	45607 abc
1517-91	3007.0 e-n	97.7 a	31.5 ab	43338 abc
STV 324	3000.3 e-n	96.8 a-d	33.4 ab	49238 abc
PREMA	2961.0 f-n	90.4 e	32.1 ab	54683 abc
ROYALE	2927.7 f-n	96.2 a-d	32.6 ab	52414 abc
MAXXA	2891.4 g-n	93.5 d	33.1 ab	48103 abc
COKER 130	2859.4 g-n	97.6 a	32.1 ab	45607 abc
1517-75	2849.9 g-n	96.1 a-d	30.6 ab	55364 ab
ACALA 2745	2821.8 g-n	95.7 a-d	33.0 ab	40388 bc
1517-77BR	2810.7 g-n	97.0 a-d	32.4 ab	49238 abc
1517-SR3	2786.2 g-n	95.7 a-d	31.5 ab	48784 abc
ACALA B510	2730.7 h-n	94.6 a-d	31.3 ab	46969 abc
STV 907	2718.1 h-n	95.9 a-d	31.5 ab	45607 abc
1517-V	2684.0 i-n	94.9 a-d	33.8 ab	53549 abc
STV 453	2668.4 j-n	97.1 a-c	31.4 ab	43792 abc
1517-88	2564.0 k-n	96.1 a-d	32.4 ab	61036 a
1517-SR1	2532.1 l-n	95.8 a-d	32.5 ab	48784 abc
ACALA 6658	2500.3 m-n	96.8 a-d	31.5 ab	44473 abc
NAZAS 77	2498.4 m-n	93.9 cd	35.0 a	43792 abc
PIMA S-6	2445.4 n	76.7 f	33.3 ab	49011 abc
1517-SR2	2430.6 n	93.8 cd	33.4 ab	48330 abc
MAR-3	1806.1 o	97.1 a-c	32.8 ab	44019 abc
MAR-5	1782.4 o	95.8 a-d	31.0 ab	41296 bc
MAR-4	1659.4 o	97.0 a-d	30.8 ab	60356 a
MAR-1	1495.0 o	95.5 a-d	30.8 ab	41296 bc
MAR-2	1375.0 o	94.0 d-d	33.0 ab	41296 bc
AVERAGE	2918.0	95.8	32.1	47732
LSD (05)	582.9	2.9	3.8	14439.6
C.V.(%)	26.3	3.9	8.1	21.6

1. Seed Cotton yields in pounds per acre.
2. Plant height in inches.
3. Values within a column followed by the same letter are not significantly different at the 5% level of probability using the Duncan multiple range test.

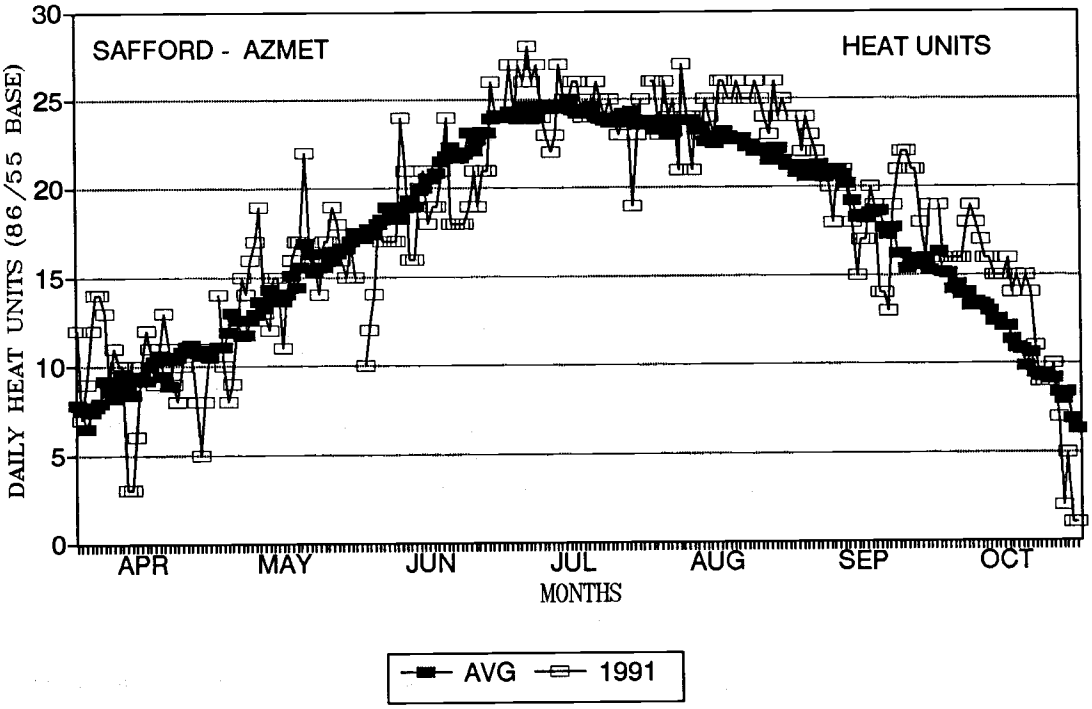

Figure 1. Daily heat units for 1991 and the average plotted against time.

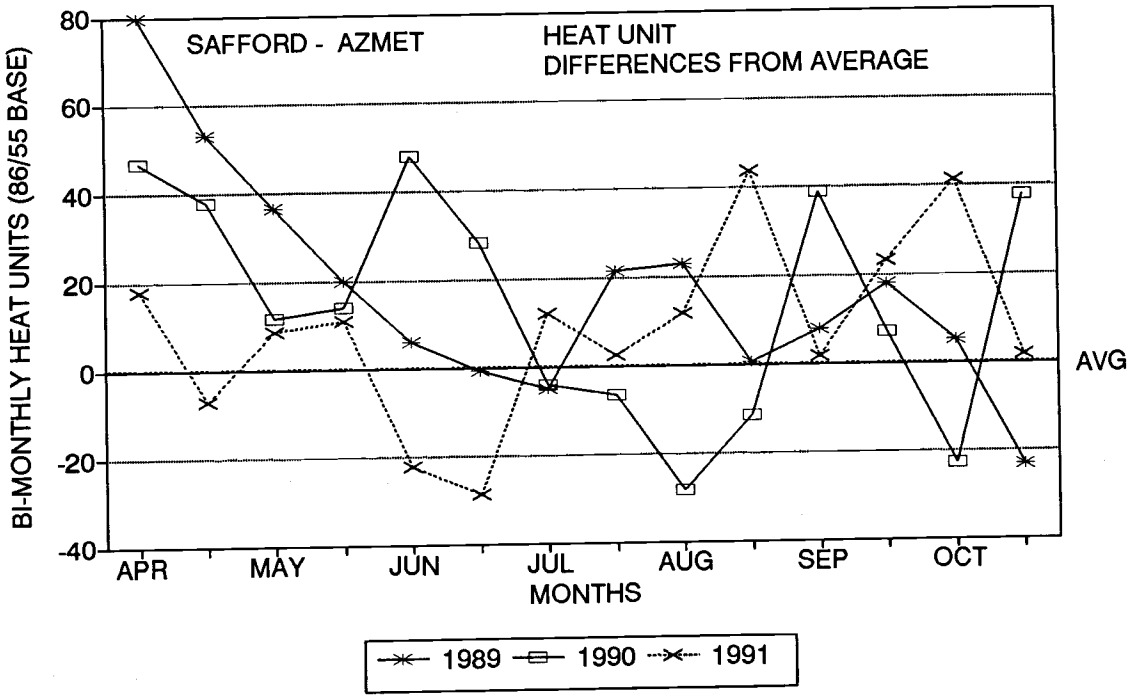

Figure 2. Heat unit differences from the average for 1989, 1990 and 1991 plotted against time.