

UPLAND COTTON RESEARCH RESULTS - 1970

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The Season

The 1970 growing season, as in 1969, was again characterized by extremely hot weather coupled with widespread damage from pink bollworm and cotton leaf perforators. These conditions combined to reduce the state average yield to the lowest in over 15 years. Sterility, as evidenced by a failure of anthers to shed pollen, was observed at the Cotton Research Center, especially during the latter half of July. This sterility, it is believed, was caused by the high temperatures. The mean temperature for July in Phoenix was 95° with 27 days in which night temperatures failed to go below 80°. A 1969-70 record of temperatures for July and August is shown in Table 1.

Table 1  
Temperatures for July & August 1969-70  
Selected Locations - Arizona

	1969						1970					
	<u>July</u>			<u>August</u>			<u>July</u>			<u>August</u>		
	80° Min. Day	105° Max. Day	Mo. Avg. Temp	80° Min. Day	105° Max. Day	Mo. Avg. Temp	80° Min. Day	105° Max. Day	Mo. Avg. Temp	80° Min. Day	105° Max. Day	Mo. Avg. Temp
Phoenix	22	15	93.1	25	21	94.4	27	24	95.0	22	15	92.5
Yuma Valley	13	23	91.7	20	28	94.3	10	27	92.6	18	26	92.7

Crop Maturity

The crop maturity distribution for 1970 at the Cotton Research Center was very similar to 1969 except that a higher percentage of the total crop in 1970 was picked on September 1. This portion of the crop was least affected by heat and was matured before pink bollworm infestations were severe. Cotton leaf perforators and pink bollworms greatly curtailed the later production of the crop. A comparison of the past three seasons is shown in Table 2.

Table 2  
 Percent of Crop Harvested by Date  
 Cotton Research Center\*  
 1968-69-70

Harvest Date	1968	1969	1970
September 1	23.1	24.2	32.5
September 15	66.0	64.2	58.5
October 1	93.0	76.3	68.2
October 15	100.	89.8	89.6
November 1	--	95.8	100.
November 15	--	100.	--
Yield - lint/acre	1519	1508	765

\* Data for Deltapine 16 variety only.

#### Regional Variety Test

This test included most of the commercial varieties grown in Arizona plus several experimental strains from California, Arizona, and New Mexico and some strains from commercial sources. Yields at the Cotton Research Center were much lower than normal. Pink bollworm damage, which resulted in excessive boll rot, plus high temperatures caused much of this yield loss. A relatively small amount of cotton was made during the latter half of the growing season, a situation especially favoring the earlier cottons. The Marana yields were more nearly normal but they were also reduced some by pink bollworm and heat. Again, the earlier cottons were generally the highest yielders. Yields and laboratory data for these two tests are shown in Tables 3 and 4.

Table 3  
Regional Variety Test  
Yield - Seed Cotton Per Acre  
Arizona-1970

Phoenix		Marana	
Variety	Lbs/acre	Variety	Lbs/acre
Deltapine 6137	921 a	6401	952 a
Deltapine 16wdb	815 b	Stoneville 256	950 a
Stoneville 256	786 bc	Deltapine 16wdb	931 ab
Deltapine 16	765 bc	Coker 201	917 ab
SS-32	690 cd	SS-32	909 abc
Coker 310-902	597 de	Deltapine 6137	906 abc
6218	590 de	S-845	860 abcd
6401	586 de	6218	856 abcd
Coker 310-903	579 def	S-913	827 abcd
1517V	556 efg	S-918	802 bcde
688	530 efgh	Coker 310-903	800 bcde
SJ-1	526 efgh	1517-70	799 bcde
S-845	496 efgh	SJ-1	799 bcde
Coker 201	491 efgh	Coker 310-902	764 cde
Paymaster 111	469 fgh	1517V	755 de
S-913	458 gh	688	754 de
S-918	456 gh	Deltapine 16	739 de
1517-70	423 gh	Paymaster 111	666 e

Table 4

Comparison of Fiber Characteristics  
Regional Variety Tests  
1970

UHM				UNIFORMITY RATIO			
Marana		Phoenix		Marana		Phoenix	
1517V	1.21	688	1.22	S-918	82	S-918	82
688	1.19	1517V	1.21	688	80	6401	82
1517-70	1.14	S-913	1.15	6218	80	1517V	81
S-913	1.14	S-845	1.15	1517V	79	S-913	80
S-918	1.14	SJ-1	1.15	S-913	78	SJ-1	79
Coker 310-902	1.14	Deltap.16wdb	1.15	1517-70	78	Deltap.16wdb	79
S-845	1.14	1517-70	1.15	Paymaster 111	78	SS-32	79
Coker 310-903	1.14	6401	1.14	6401	77	Paymaster 111	79
SJ-1	1.13	SS-32	1.14	SS-32	76	688	78
Deltap.16wdb	1.12	Coker 310-903	1.14	S-845	76	S-845	78
6401	1.10	Stoneville 256	1.12	SJ-1	76	Deltap. 6137	78
SS-32	1.10	Coker 310-902	1.12	Deltap. 16	75	Coker 201	77
6218	1.09	S-918	1.12	Coker 201	75	6218	77
Deltap. 16	1.09	Coker 201	1.12	Coker 310-902	74	1517-70	75
Coker 201	1.08	Deltap. 16	1.11	Deltap. 6137	74	Deltap. 16	75
Deltap. 6137	1.08	Deltap. 6137	1.08	Deltap.16wdb	74	Stoneville 256	73
Stoneville 256	1.08	6218	1.07	Coker 310-903	74	Coker 310-902	73
Paymaster 111	1.04	Paymaster 111	1.02	Stoneville 256	72	Coker 310-903	73

  

STRENGTH				MICRONAIRE			
Marana		Phoenix		Marana		Phoenix	
688	4.23	688	3.95	Coker 201	4.59	Deltap.16wdb	5.28
1517V	4.03	1517V	3.89	S-913	4.59	Deltap. 16	5.17
S-913	3.87	S-913	3.89	S-918	4.58	Coker 201	5.17
SJ-1	3.85	1517-70	3.85	Deltap.16wdb	4.58	Deltap. 6137	5.13
1517-70	3.84	SJ-1	3.78	6401	4.53	Coker 310-902	5.03
S-918	3.74	S-845	3.74	Deltap. 6137	4.47	Coker 310-903	5.01
6218	3.71	S-918	3.66	Paymaster 111	4.43	Stoneville 256	4.93
6401	3.70	6401	3.59	Stoneville 256	4.31	S-913	4.87
S-845	3.63	6218	3.54	SJ-1	4.30	S-918	4.83
SS-32	3.58	SS-32	3.49	1517-70	4.30	Paymaster 111	4.82
Paymaster 111	3.25	Paymaster 111	3.22	Coker 310-902	4.30	6401	4.81
Coker 310-902	3.24	Coker 201	3.21	Deltap. 16	4.29	SJ-1	4.73
Deltap. 16	3.22	Deltap.16wdb	3.20	Coker 310-903	4.28	SS-32	4.65
Deltap. 6137	3.20	Deltap. 16	3.09	6218	4.21	S-845	4.55
Deltap.16wdb	3.14	Deltap. 6137	3.06	S-845	4.16	688	4.48
Coker 310-903	3.13	Stoneville 256	3.01	688	4.11	6218	4.43
Coker 201	3.08	Coker 310-903	3.01	SS-32	4.10	1517-70	4.37
Stoneville 256	2.98	Coker 310-902	3.00	1517V	4.02	1517V	4.29

Table (Continued)

YIELD				LINT %			
Marana		Phoenix		Marana		Phoenix	
6401	952	Deltap. 6137	921	6401	39.1	Deltap. 6137	38.1
Stoneville 256	950	Deltap.16wdb	815	Deltap. 6137	38.6	Coker 310-903	37.2
Deltap.16wdb	931	Stoneville 256	786	Coker 201	37.8	Coker 310-902	37.1
Coker 201	917	Deltap. 16	765	Coker 310-903	37.3	6401	37.1
SS-32	909	SS-32	690	Coker 310-902	37.0	6218	36.4
Deltap. 6137	906	Coker 310-902	597	6218	37.0	Deltap.16wdb	36.4
S-845	860	6218	590	Deltap.16wdb	36.7	Coker 201	36.0
6218	856	6401	586	Stoneville 256	36.6	Stoneville 256	35.8
S-913	827	Coker 310-903	579	1517V	35.8	Deltap. 16	35.8
S-918	802	1517V	556	S-845	35.5	S-918	35.1
Coker 310-903	800	688	530	Deltap. 16	35.5	1517V	34.8
1517-70	799	SJ-1	526	S-918	35.5	SJ-1	34.8
SJ-1	799	S-845	496	SJ-1	35.4	Paymaster 111	34.7
Coker 310-902	764	Coker 201	491	688	35.2	S-845	34.6
1517V	755	Paymaster 111	469	SS-32	34.9	SS-32	34.5
688	754	S-913	458	S-913	34.8	688	34.4
Deltap. 16	739	S-918	456	1517-70	34.4	S-913	34.1
Paymaster 111	666	1517-70	423	Paymaster 111	33.8	1517-70	32.9

  

SEED INDEX				LINT INDEX			
Marana		Phoenix		Marana		Phoenix	
SJ-1	13.1	SJ-1	14.9	6401	7.4	SJ-1	7.9
S-913	13.1	S-845	14.9	SJ-1	7.2	S-845	7.9
S-845	13.0	S-913	14.7	S-845	7.2	6401	7.7
S-918	12.8	688	14.4	S-918	7.0	S-913	7.6
688	12.5	1517-70	14.1	S-913	7.0	688	7.6
1517V	12.5	S-918	14.0	1517V	6.9	S-918	7.6
1517-70	12.4	1517V	13.2	688	6.8	1517V	7.1
Paymaster 111	12.0	Paymaster 111	13.2	1517-70	6.5	Paymaster 111	7.0
6401	11.6	6401	13.1	6218	6.4	Coker 310-903	6.9
SS-32	11.5	SS-32	13.0	Coker 201	6.4	SS-32	6.9
6218	10.9	Coker 201	12.1	Deltap. 6137	6.4	1517-70	6.9
Coker 201	10.5	Coker 310-903	11.7	Coker 310-903	6.2	Coker 310-902	6.8
Deltap. 16	10.4	Coker 310-902	11.5	Paymaster 111	6.2	Coker 201	6.8
Coker 310-903	10.4	6218	11.4	SS-32	6.2	Deltap. 6137	6.7
Coker 310-902	10.3	Deltap. 16	11.4	Coker 310-902	6.1	6218	6.5
Deltap.16wdb	10.2	Deltap.16wdb	11.2	Deltap.16wdb	5.9	Deltap. 16	6.4
Deltap. 6137	10.1	Stoneville 256	11.2	Stoneville 256	5.8	Deltap.16wdb	6.4
Stoneville 256	10.1	Deltap. 6137	10.8	Deltap. 16	5.8	Stoneville 256	6.2

Verticillium Wilt Laboratory Research (Cotton Producers Institute Funds)

The factors which influence the resistance of cotton plants to Verticillium albo-atrum appear to be controlled by several genes. Thus the search for resistant lines which also are high producers of quality cotton is tedious and uncertain. For several years the Cotton Producer's Institute has financed research in an attempt to find a "chemical fingerprint" which would enable a more rapid identification of resistant clones. Working cooperatively with Drs. S. Alcorn and R. Caldwell of the Department of Plant Pathology, two compounds have been observed which may produce such a fingerprint. One is an unidentified, amino acid-like compound; the other is scopoletin. Our most intensive studies relate to scopoletin. A tabulation of tolerance based on scopoletin is shown in Table 5.

Table 5

VERTICILLIUM WILT TOLERANCE COMPARISONS  
Laboratory vs. Breeder Experience  
Marana, Arizona - 1968

3-4 Leaf Stage			Breeder Rank	
Variety	Group	Amount* Scopoletin	Variety	Group
E-364	1	126.2	Acala 1517V	1
9765	1	117.9	E-364	1
6024	1	110.6	9765	1
Deltapine 5540	1	108.9	6016	1
Acala 1517V	1	103.5	5915	1
Hopicala	2	93.9	Acala 4-42	2
6218	2	82.5	6024	2
Acala 4-42	2	68.9	6218	2
Deltapine S.L.	2	57.5	6420	2
6017	2	57.2	Deltapine 5540	2
5915	2	55.6	6017	2
6016	2	54.2	Hopicala	2
6420	3	53.8	6107-38	3
Pima S-3	3	53.0	Pima S-3	3
Acala Imperial	3	48.4	5909-B	3
5909-B	3	47.9	Acala Imperial	3
6107-38	3	40.3	Deltapine S.L.	3
Coker 301	3	29.6	Coker 201	3

\* Amount of Scopoletin as mg/gm dry wt. x 10. 1 = Tolerant; 2 = Intermediate; 3 = Susceptible.