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## MISSOURI CROP PERFORMANCE

### COTTON

1981

This report is a contribution of the Department of Agronomy, University of Missouri Agricultural Experiment Station, which reports on Research Project 363. The work was supported in part by funds from the Missouri Seed Improvement Association and fees from the companies submitting varieties for evaluation.

Cotton variety tests became part of the University of Missouri's crop performance testing program in 1978. These tests are conducted to provide a reliable, unbiased, up-to-date source of information which will permit valid comparisons among the varieties evaluated.

#### COMPARING VARIETIES

In each trial, the "top yielding varieties" have been identified. These varieties are those which did not yield significantly less than the highest yielding variety in the test. They are denoted in the tables by an asterisk (\*) next to their yields. Thus, by going down a column, the highest yielding varieties in a trial can be readily identified. By going across, the relative performance of a variety during several years or at several locations can be evaluated. From the standpoint of yield, the most desirable varieties will be those which are among the "top yielding" varieties (that is, have an asterisk) the greatest number of times.

Although yield usually receives first consideration, other agronomic characteristics may be equally important when selecting a cotton variety. For southeastern Missouri, maturity, seedling vigor, and reaction to diseases are among the additional characteristics which deserve careful consideration. Late maturing varieties can be injured by early fall frost, particularly when planting is delayed. High seed viability and good seedling vigor help insure uniform and adequate stands under occasionally adverse conditions. Several prevalent diseases can markedly reduce final yield of susceptible varieties. Thus, all the information presented in this report should be considered when selecting a variety.

The Missouri Agricultural Experiment Station does not make specific recommendations for varieties. It is suggested that the farmers growing a new variety for the first time consider the information contained in this report and then grow a small acreage to determine adaptability. This should be the practice for all new varieties regardless of origin.

#### EXPERIMENTAL PROCEDURES

Three locations were selected to represent the soil diversity in the cotton growing area of southeastern Missouri. These locations were the University of Missouri's Rhodes Farm near Clarkton (sandy soil), the Delta Research Center near Portageville (clay soil), and the David Andrews farm near Senath (loam soil). The Clarkton test was on a site infested with fusarium wilt and root knot nematode. Locations of the sites are shown on Figure 1.

Entries. All producers of cotton seed were eligible to enter varieties in the 1981 evaluation plots. Participation was voluntary and no control was exercised by the program over which or how many varieties were entered. However, to help finance the evaluation program, a fee of forty dollars per location was charged for each entry entered by the seed producer. A total of 13 cotton varieties were compared in 1981.

Field Plot Design. Individual entries were planted in four-row plots with four replications. Arrangement of plots within the field followed a randomized block design. Each plot had a row length of 40 feet and a between-row spacing of 38 inches. The two center rows were used for all yield and quality information.

Cultural Practices. The tests were planted and harvested with commercial equipment modified for small plot work. Details of the management practices followed at each location are given in Table 1 and rainfall and temperature in Table 2, page 7.

Data Recorded. Seedling vigor notes were taken soon after emergence to give a relative indication of survival capabilities of the young plants. Seedling vigor was rated on a scale of 1 to 5 with 1 indicative of high vigor and 5 indicative of low vigor. The total number of plants in the center two rows of each plot were counted and converted to number of plants per acre. At maturity, height, lodging, and yield were measured. Height was taken as the average distance in inches from the soil surface to the top of the plant. Lodging, which gives the degree of erectness, was scored on a scale of 1 to 5 with 1 indicating that all plants were erect (no lodging) and 5 indicating that 80 percent, or more, of the plants were lodged. Yield was measured in total pounds of lint per acre. This value was calculated by multiplying the gin percentage (lint percentage) by the total seed cotton yield. Fiber quality characteristics were determined for each variety utilizing lint cotton samples from two replications at test location. These characteristics and their importance are described below. Their values were determined by Starlab, Inc., Knoxville, Tennessee.

- A. Micronaire: The micronaire test provides a combined measure of maturity and fineness of cotton fibers. Fiber maturity is a relative measure of the cell-wall development throughout the entire length of the cotton fiber. Immature fibers result in decreased rates of processing, dyeing problems, and the production of yarns and fabrics with low appearance grade. Fineness is a relative measure of either the diameter of individual cotton fibers or the weight per unit length. Fine cottons produce stronger yarns but require reduced rate of processing.

In the test, air is passed through a compressed sample of cotton fiber. The rate of flow through the sample follows a relationship between diameter or thickness of the textile fibers and the air resistance they provide. Finer fibers result in greater resistance and, therefore, a lesser air flow. Value recorded can be interpreted as follows:

4.9 and above = coarse fibers  
3.5 to 4.8 = premium range  
3.4 and below = fine and often immature

- B. Length: Long-fibered cottons are desirable because fiber length relates positively to yarn strength, spinning of finer yarns, and high speed processing. The 2.5 percent span length measures the length in inches spanned by 2.5 percent of the fibers. The 50 percent span length is another measurement of fiber quality. This measures the length in inches spanned by 50 percent of the fiber.
- C. Elongation: Cottons having high fiber elongation values have less end breakage during the weaving process than those with low

values. The elongation figure is expressed in percent elongation at the breaking point. The following designations will aid in the interpretation of the elongation values.

Descriptive Designation	Fiber Elongation
	--Percent--
Very low	5.3 and below
Low	5.4 - 6.2
Average	6.3 - 7.1
High	7.2 - 8.0
Very high	8.1 and above

- D. Strength: Yarn strength and ease of manufacturing are correlated positively with strong-fibered cottons. The following chart categorizes strength readings and aids in the interpretation of strength values.

Strength Rating	1/8-inch Gauge
	--grams/tex--
Very high	Above 24.9
High	23.0 - 24.9
Average	21.0 - 22.9
Low	19.0 - 20.9
Very low	Below 19.0

## RESULTS

Thirteen cotton varieties were evaluated at 3 locations in southeastern Missouri during 1981. The trial locations were selected to represent the soil diversity in the cotton growing area of the state. Due to the extreme cold and wet weather in the early part of May, all locations had to be replanted. After replanting in late May, only Senath and Clarkton established a stand. Because of the length of time needed to mature most full season cotton varieties, no attempt at a third planting was made in the Delta Center's clay soil.

Conditions during 1981 and cotton performance at each location are briefly described below.

CLARKTON. The trial at this location was grown on a sandy soil with a high degree of fusarium wilt and root-knot nematode. Irrigation was used, but it relieved little of root-knot nematode pressure or the fusarium wilt. Total lint yield ranged from 82 to 264 pounds per acre with an average of 159 (Table 3).

SENATH. The soil at this location is a deep loam soil. Cold wet temperatures forced a late re-planting. This trial was not irrigated. Total lint yield ranged from 415 to 801 with an average of 572 pounds per acre (Table 5).

Average performance of 13 varieties over all tests is given in Table 7. The stress conditions experienced may have prevented some varieties from expressing their true yield potential. Further, late planting conditions prevented satisfactory separation of the varieties tested on the basis of yield. Even though experimental conditions were quite uniform, re-planting in late May did not allow many full season varieties time to mature before first frost.

Several quality characteristics were affected by the growing conditions and late planting in 1981. Micronaire and fiber strength were reduced as compared to 1980. Elongation was increased over 1980. Lint percentage and staple length were similar to those previously recorded. Data on fiber characteristics are summarized in Table 4 (Clarkton), Table 6 (Senath), and Table 8 (Location Summary).

TABLE 1. CULTURAL PRACTICES OF THE 1981 COTTON TRIALS.

LOCATION (COUNTY)	COOP- ERATOR	N-P205-K20	HERBICIDE	INSECT- ICIDE	DATE OF PLANT.	DATE OF HARVEST
CLARKTON (DUNKLIN)	CHARLES CROMWELL	10-20-70	TREFLAN	TERRA- CHLOR S-X	4-30 5-22	10-21
SENATH (DUNKLIN)	DAVID ANDREWS	50-00-00	TREFLAN + COTORAN	TERRA- CHLOR S-X	5-04 5-27	10-19

TABLE 2. RAINFALL AND TEMPERATURE DURING 1981.

LOCATION	MONTH	RAINFALL			TEMPERATURE		
		INCHES	DEPART. FROM NORMAL	RAINY DAYS	° F	DEPART. FROM NORMAL	90° OR ABOVE
CLARKTON*	APRIL	2.6	--	5	64.9	--	0
	MAY	5.6	--	8	63.9	--	0
	JUNE	4.8	--	7	78.6	--	14
	JULY	--	--	--	--	--	--
	AUGUST	2.3	--	3	77.6	--	15
	SEPT.	0.9	--	1	70.0	--	4
SENATH*	APRIL	2.3	--	7	65.2	--	0
	MAY	6.3	--	8	64.7	--	1
	JUNE	7.1	--	8	77.9	--	14
	JULY	4.7	--	6	82.2	--	23
	AUGUST	1.9	--	4	77.8	--	18
	SEPT.	0.6	--	2	69.1	--	3

-- DATA NOT AVAILABLE.

\* CLARKTON (MALDEN DATA), SENATH (KENNETT DATA).

FIGURE 1. MISSOURI COTTON TRIAL LOCATIONS



TABLE 3. YIELD PERFORMANCE OF COTTON VARIETIES GROWN NEAR CLARKTON, MISSOURI  
IN 1979-81.

PLANTED: 30 APRIL, 1981. REPLANT: 22 MAY. HARVESTED: 21 OCT., 1981.

BRAND/VARIETY	STAND (PL/A)	LOD- GING (1-5)	VIGOR (1-5)	HGT. (IN)	LINT (%)	TOTAL LINT (LBS/ACRE)		
						1981	1980	1979
DELCOT 311	47439	1.5	1.3	24	37.5	264**	723*	417*
COKER 3131	40601	1.8	2.0	22	39.0	214*	655*	--
COKER 310	45719	1.0	1.8	21	37.0	185*	658*	415*
COKER 315	41547	1.0	1.3	27	35.5	185*	576	338
QUAL. SEED QS-137	46923	1.3	1.0	26	33.0	181*	704*	--
COKER 3114	43999	1.3	1.3	24	40.0	179	--	--
STONEVILLE 213#	43913	1.8	1.5	27	34.5	167	605	288
COKER 304	43354	1.0	1.0	23	37.0	160	639*	384*
DELTAPINE 41	48386	1.0	2.0	18	36.0	127	725*	376*
DELTAPINE 55	49375	1.3	1.0	18	35.5	110	717*	327
DELTAPINE 7544-643	44128	1.5	1.5	20	34.5	109	--	--
STONEVILLE 825#	43569	1.3	1.5	20	36.0	108	--	--
DELTAPINE 62	45117	1.0	1.5	16	36.0	82	--	--
TRIAL MEAN	44928	1.3	1.4	22	36.3	159	653	350
LSD.05	4102	0.5	NS	5.4	1.5	84	161	64
C.V. %	6.4	27.6	35.0	17.0	2.8	36.8	17.3	13.1

-- DATA NOT AVAILABLE.

\*\* HIGHEST YIELDING VARIETY IN THE TEST.

\* VARIETY WHICH DID NOT YIELD SIGNIFICANTLY LESS THAN THE HIGHEST YIELDING VARIETY IN THE TEST.

NS NOT SIGNIFICANT AT THE .5% LEVEL.



TABLE 4. FIBER CHARACTERISTICS OF COTTON VARIETIES GROWN NEAR CLARKTON, MO.  
 IN 1981.  
 PLANTED: 30 APRIL, 1981. REPLANT: 22 MAY. HARVESTED: 21 OCT., 1981.

BRAND/VARIETY	MICRO- NAIRE	STAPLE LENGTH		ELONGATION	STRENGTH
		(50%)	(2.5%)	(%)	(G/TEX)
COKER 304	3.40	0.52	1.17	6.63	20.9
COKER 310	3.40	0.52	1.18	7.38	21.4
COKER 3114	3.50	0.53	1.20	7.75	22.8
COKER 3131	3.35	0.52	1.14	8.00	21.3
COKER 315	3.55	0.53	1.18	7.25	21.3
DELCOT 311	3.40	0.55	1.17	9.25	23.0
DELTAPINE 41	3.05	0.51	1.15	7.38	21.6
DELTAPINE 55	3.10	0.50	1.15	7.88	20.0
DELTAPINE 62	3.15	0.51	1.15	7.75	21.5
DELTAPINE 7544-643	3.30	0.51	1.11	9.38	20.2
QUALITY SEED QS-137	3.50	0.53	1.15	8.13	21.8
STONEVILLE 213#	3.50	0.52	1.13	8.50	19.7
STONEVILLE 825#	3.30	0.50	1.13	7.25	20.6
MEAN	3.35	0.52	1.16	7.88	21.3
LSD.05	0.22	0.02	0.02	0.85	1.6
C.V.	3.06	1.48	0.66	4.97	3.5

NS NOT SIGNIFICANT AT THE 5% LEVEL.

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TABLE 5. YIELD PERFORMANCE OF COTTON VARIETIES GROWN NEAR SENATH, MISSOURI  
IN 1980-81.

PLANTED: 4 MAY, 1981. REPLANTED: 27 MAY. HARVESTED: 19 OCT., 1981.

BRAND/VARIETY	STAND (PL/A)	LOD- GING (1-5)	VIGOR (1-5)	HGT. (IN)	LINT (%)	TOTAL LINT (LBS/ACRE)		
						1981	1980	1979
COKER 315	39698	1.0	1.3	39	35.5	801**	617*	1151*
CASCOT L-7#	35999	2.0	2.5	39	36.5	695	--	--
COKER 304	29978	1.0	2.8	43	36.0	670	573*	1099
DELCOT 311	26494	1.3	2.3	45	37.0	630	548*	1011
COKER 3114	38493	1.0	2.5	42	38.5	623	--	--
COKER 310	31096	1.0	1.8	43	35.0	577	633*	1067
QUAL. SEED QS-137	33633	1.3	2.0	41	35.0	562	535	--
DELTAPINE 7544-643	40429	1.8	2.5	44	35.5	538	--	--
COKER 3131	26924	1.0	1.8	42	36.5	532	512	--
DELTAPINE 62	37504	1.5	1.5	40	33.5	517	--	--
STONEVILLE 213#	35612	1.5	2.0	42	35.5	497	588*	1079
STONEVILLE 825#	45719	1.8	2.0	46	34.0	478	--	--
DELTAPINE 41	30623	1.0	1.5	39	34.5	477	678*	1274**
DELTAPINE 55	41203	1.0	1.0	42	35.0	415	596*	1030
TRIAL MEAN	35243	1.3	2.0	42	35.6	572	552	1035
LSD.05	9467	0.5	NS	NS	1.5	NS	413	128
C.V. %	18.7	24.9	48.4	10.7	3.0	29.0	18.4	8.7

-- DATA NOT AVAILABLE.

\*\* HIGHEST YIELDING VARIETY IN THE TEST.

\* VARIETY WHICH DID NOT YIELD SIGNIFICANTLY LESS THAN THE HIGHEST YIELDING VARIETY IN THE TEST.

NS NOT SIGNIFICANT AT THE 5% LEVEL.

TABLE 6. FIBER CHARACTERISTICS OF COTTON VARIETIES GROWN NEAR SENATH, MISSOURI IN 1981.

PLANTED: 4 MAY, 1981. REPLANTED: 27 MAY. HARVESTED: 19 OCT., 1981.

BRAND/VARIETY	MICRO- NAIRE	STAPLE LENGTH		ELONGATION	STRENGTH
		(50%)	(2.5%)	(%)	(G/TEX)
COKER 304	3.95	0.55	1.19	7.13	21.3
COKER 310	3.80	0.56	1.20	6.88	20.4
COKER 3114	3.95	0.57	1.21	7.63	20.6
COKER 3131	3.95	0.56	1.18	7.50	19.3
COKER 315	3.90	0.58	1.19	7.25	21.7
DELCOT 311	4.05	0.56	1.13	9.00	20.9
DELTAPINE 41	4.00	0.56	1.16	8.13	19.6
DELTAPINE 55	3.65	0.54	1.14	8.38	19.6
DELTAPINE 62	3.90	0.57	1.16	7.88	21.2
DELTAPINE 7544-643	4.05	0.53	1.11	9.13	17.4
QUALITY SEED QS-137	3.95	0.51	1.12	8.75	18.9
STONEVILLE 213#	4.40	0.54	1.14	8.88	19.4
STONEVILLE 825#	4.25	0.54	1.11	6.75	19.0
MEAN	3.98	0.55	1.16	7.94	20.0
LSD.05	NS	NS	0.05	1.35	NS
C.V.	6.79	3.16	1.88	7.82	6.4

NS NOT SIGNIFICANT AT THE 5% LEVEL.

TABLE 7. YIELD PERFORMANCE OF COTTON VARIETIES GROWN AT 2 SOUTHEAST MISSOURI LOCATIONS (CLARKTON AND SENATH) IN 1981.

BRAND/VARIETY	1981 -- 2 LOCATION AVERAGE							
	STAND	LOD- GING	VIGOR	HT.	LINT	TOTAL LINT (LBS/ACRE)		
	(PL/A)	(1-5)	(1-5)	(IN)	(%)	CLARK	SENTH	MEAN
COKER 315	40622	1.0	1.3	33	35.5	185*	801**	493**
DELCOT 311	36967	1.4	1.8	35	37.3	264**	630	447*
COKER 304	36666	1.0	1.9	33	36.5	160	670	415*
COKER 3114	41246	1.1	1.9	33	39.3	179	623	401*
COKER 310	38407	1.0	1.8	32	36.0	185*	577	381*
COKER 3131	33762	1.4	1.9	32	37.8	214*	532	373*
QUALITY SEED QS-137	40278	1.3	1.5	34	34.0	181*	562	372*
STONEVILLE 213#	39762	1.6	1.8	34	35.0	167	497	332
DELTAPINE 7544-643	42278	1.6	2.0	32	35.0	109	538	324
DELTAPINE 41	39504	1.0	1.8	28	35.3	127	477	302
DELTAPINE 62	41311	1.3	1.5	28	34.8	82	517	300
STONEVILLE 825#	44644	1.5	1.8	33	35.0	108	478	293
DELTAPINE 55	45289	1.1	1.0	30	35.3	110	415	263
MEAN	40057	1.3	1.7	32	36.0	159	572	361
LSD.05	5160	0.3	0.8	4.2	1.5	84	NS	128
C.V. %	12.9	27.2	45.4	13.0	2.9	36.8	29.0	35.6

\*\* HIGHEST YIELDING VARIETY IN THE TEST.

\* VARIETY WHICH DID NOT YIELD SIGNIFICANTLY LESS THAN THE HIGHEST YIELDING VARIETY IN THE TEST.

NS NOT SIGNIFICANT AT THE 5% LEVEL.

TABLE 8. SUMMARY PERFORMANCE OF COTTON VARIETIES GROWN AT TWO MISSOURI LOCATIONS (CLARKTON AND SENATH) IN 1981.

BRAND/VARIETY	TWO LOCATION AVERAGE				
	MICRO- NAIRE	STAPLE LENGTH		ELONGATION (%)	STRENGTH (G/TEX)
		(50%)	(2.5%)		
COKER 304	3.67	0.53	1.18	6.88	21.1
COKER 310	3.60	0.54	1.19	7.13	20.9
COKER 3114	3.72	0.55	1.20	7.69	21.7
COKER 3131	3.65	0.54	1.16	7.75	20.3
COKER 315	3.72	0.56	1.19	7.25	21.5
DELCOT 311	3.72	0.56	1.15	9.13	22.0
DELTAPINE 41	3.52	0.53	1.15	7.75	20.6
DELTAPINE 55	3.37	0.52	1.15	8.13	19.8
DELTAPINE 62	3.52	0.54	1.15	7.81	21.4
DELTAPINE 7544-643	3.67	0.52	1.11	9.25	18.8
QUALITY SEED QS-137	3.72	0.52	1.13	8.44	20.4
STONEVILLE 825#	3.77	0.52	1.12	7.00	19.8
STONEVILLE 213#	3.95	0.53	1.14	8.69	19.6
MEAN	3.67	0.54	1.16	7.91	20.6
LSD.05	0.21	0.04	0.02	0.54	1.1
C.V.	5.58	2.52	1.41	6.56	5.1

NS NOT SIGNIFICANT AT THE 5% LEVEL.

TABLE 9. NAME OF COTTON ENTRIES AND SEED SOURCE EVALUATED IN 1981.

BRAND	VARIETY	SEED SOURCE
COKER	304, 310, 315, 3131, 3114	COKER,S PEDIGREED SEED CO., BOX 340, HARTSVILLE, SC 29550
DELTAPINE	41, 55, 62, 7544-643	DELTA & PINE LAND COMPANY, SCOTT, MS 38772
QUALITY SEED	QS-137	QUALITY SEED CO., INC., 2600 NONCONNAH BLVD., SUITE 156, MEMPHIS, TN 38132
	DELCOT 311, CASCOT L-7	ENTERED BY STATE RESEARCH STAT- IONS AND CENTERS

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