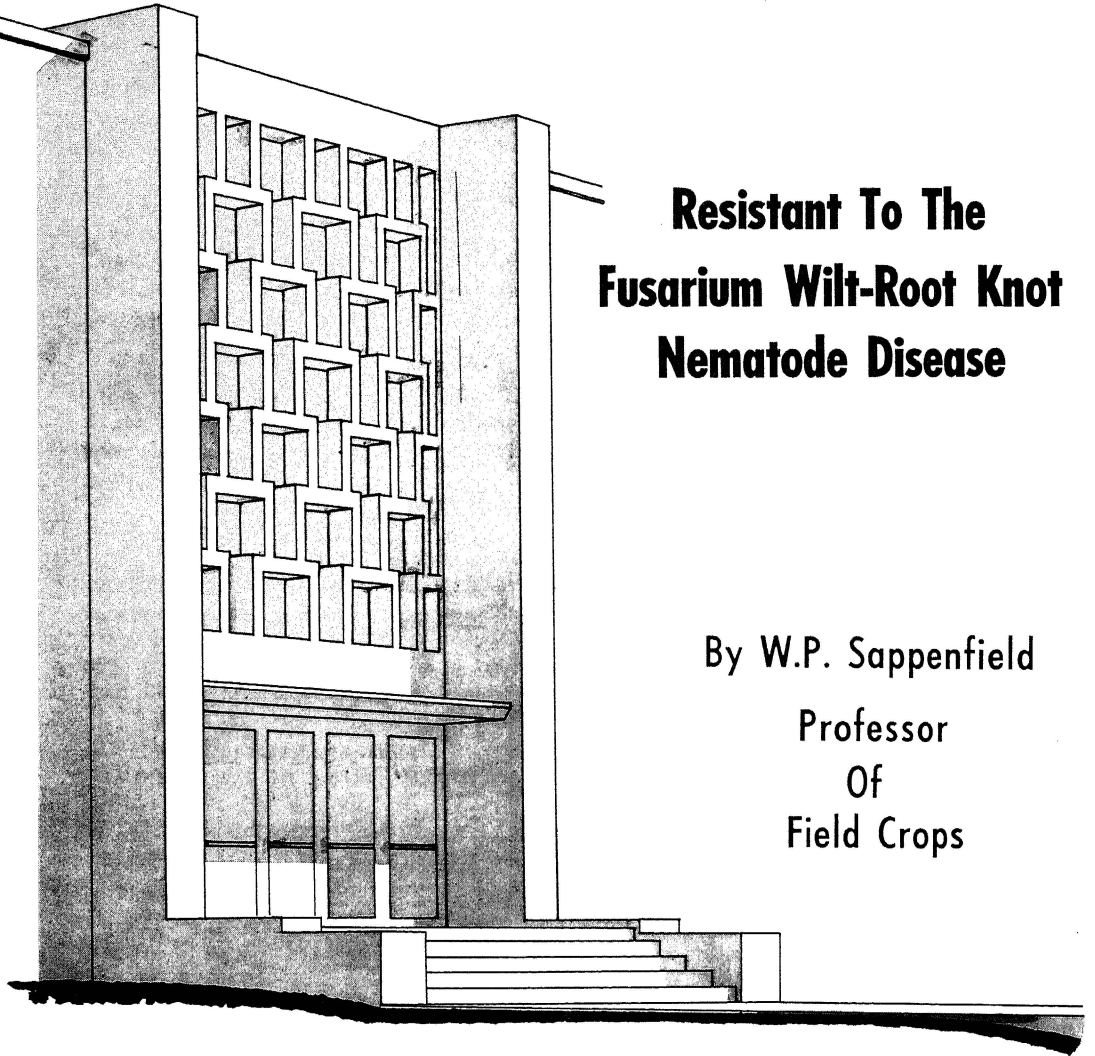


AUBURN M: A New Extra-Early Cotton Variety



**Resistant To The
Fusarium Wilt-Root Knot
Nematode Disease**

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AUBURN M: A NEW EXTRA-EARLY COTTON VARIETY RESISTANT TO THE
FUSARIUM WILT-ROOT KNOT NEMATODE DISEASE

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Cotton production losses, caused by the fusarium wilt-root knot nematode disease complex (Fusarium oxysporium f. vasinfectum (Atk.) Snyder and Hansen-Meloidogyne incognita var. acrita Chitwood, 1949), occur annually on Missouri's light sandy soils. These soils constitute approximately 1/3 or 130,000 acres of southeast Missouri's current cotton acres.

With the introduction of the Auburn 56 and Rex cotton varieties, resistant to this disease complex, losses have steadily declined.

Although Auburn 56 is highly resistant to the fusarium wilt-root knot disease and intermediate to early in maturity, it frequently has lacked the very-early maturity features required for maximum lint production during most seasons in southeast Missouri. On occasion, it also has exhibited hard-to-pick characteristics. Obvious maturity differences among plants within the Auburn 56 variety were frequently observed.

Rex, although very-early maturing and resistant to fusarium wilt, appears less tolerant to root-knot nematodes. Leaves of this variety are quite hairy and have created problems in ginning for acceptable grades. Its fiber spinning characteristics also may be below that of the Auburn 56 variety.

The Breeding of Auburn M (formerly Mo 58-3249)

A simple selection program was initiated in 1957 to develop an early-maturing, fusarium wilt-root knot nematode resistant variety by taking advantage of the obvious variability observed in Auburn 56. The new strain, Auburn M, is the product of this work.

Early maturing plants, selected from Auburn 56 by A. L. Smith at the Alabama Agricultural Experiment Station, were obtained for planting at the Delta Center, Missouri Agricultural Experiment Station at Sikeston, 1957. One of these selections was designated, Auburn 56-888.

The following illustrates selection and testing procedures during the development of Auburn M. Test results are given in Tables 1-8.

(1) Professor of Field Crops, University of Missouri. (Delta Center, Sikeston, Missouri)

6. Bolls: moderately storm resistant but fluff well and are easily picked by hand and machine. Average size 6.8 to 7.0 grams seed cotton per boll.
7. Disease reaction: resistant to the fusarium wilt-root knot nematode disease complex (Fusarium oxysporium f. vasinfectum (Atk.) Snyder and Hansen-Meloidogyne incognita var. acrita (Chitwood, 1949); moderately tolerant to verticillium wilt (Verticillium alboatrum Reinke and Berth); susceptible to bacterial blight (Xanthomonas malvacearum).
8. Lint percentage: 35.8 - 37.5%
9. Fiber quality:
 - a. Length:
 - Staple: 1 1/16 - 1 3/32 + inches
 - Upper half means: 1.10 - 1.14 inches
 - Mean length: .94 - .98 inches
 - Uniformity ratio: 85-86
 - b. Strength:
 - Tenacity (T_1): 1.74 - 1.83 grams per grex
 - Elongation (E_1): 7.5 - 8.6%
 - c. Fineness:
 - Micronaire: 4.07 - 4.50 units
 - d. Spinning quality (50 gram test)
 - Calculate standard yarn
 - skein strength of 27 tex yarns: 116-125 pounds
 - Manufacturing performance index: 100 (good)

In the tables to follow Auburn M is designated Mo. 58-3249 and its component strains are Mo. 58-432 and Mo. 58-449.

Table 1. Lint Cotton Yields for Varieties and New Strains Grown on Sandy Soil infested with Fusarium Wilt and Root-Knot Nematodes, Diehlstadt, Missouri, (1959-61).

Variety or Strain	Total Lint		Earliness		Disease Reaction			Boll Size	
	Yield lbs/acre	Lint lbs/acre	- 1st Pick		Bacterial Blight	Fusarium Wilt	Lint %	Grams	
			% Crop					Rating ^a	Incid. ^b
			1959 - 61 Average						
1. Mo. 58-432	833	618	74	S	3.7	8.9	37.1	6.8	
2. Mo. 58-449	769	601	78	S	3.7	10.8	37.2	6.6	
3. Rex	731	536	73	R	.4	19.6	37.6	6.5	
4. Auburn 56	722	477	66	S	4.0	12.3	36.6	6.2	
			1960 - 61 Average						
1. Mo. 58-3249 ^d	716	496	69	S	4.1	3.3	37.5	6.8	
2. Rex	668	456	68	R	.6	5.4	37.1	6.8	
3. Auburn 56	636	387	61	S	4.5	4.0	36.4	5.6	
			1961						
1. Mo. 58-432	821	510	62	S	4.5	.3	37.7	6.5	
2. Mo. 58-3249	764	465	61	S	4.3	.0	37.5	6.7	
3. Rex	759	451	59	R	.8	1.7	37.1	6.4	
4. Mo. 58-449	716	474	66	S	4.5	1.2	37.7	6.5	
5. Dixie King	695	372	54	S	3.8	.5	37.7	6.9	
6. Auburn 56	683	327	48	S	5.0	.7	36.4	6.0	
7. Delta Queen	617	334	54	S	3.5	2.1	37.4	5.9	
8. Stoneville 213	610	375	61	S	2.8	14.4	37.3	6.0	
L. S. D. (.05)	102	78							

^aS is susceptible; R is resistant.

^bSeverity of bacterial blight: 0-1 (trace); 2 (mild); 3 (moderate); 4 (severe); 5 (very severe).

^cSeverity of wilt as measured by the percentage of plants showing wilt symptoms.

^d1960 data were averages between Mo. 58-432 and Mo. 58-449 (1960).

Table 2. Fiber Properties of Cotton Varieties and New Strains Grown at Diehlstadt, Missouri, 1959-61.

Variety or Strain	Staple		Length		Unif. Ratio %	Strength		Fineness Mic.	Spinning Performance	
	1/32 Ins.	Ins.	Upper Half Mean	Mean		Tenac- ity T ₁	Elon- gation E ₁		Standard Yarn	Mfg. Perf.
								27 Tex Yard (22's)	(Lbs.)	
1959-61 Avg. ^a										
1. Mo. 58-432	34.7	1.12	.96		86	1.72	8.9	4.06	114	100
2. Mo. 58-449	34.7	1.09	.91		83	1.76	8.2	4.20	118	100
3. Rex	34.7	1.10	.93		85	1.61	8.8	4.09	112	100
4. Auburn 56	35.0	1.08	.93		86	1.73	8.8	4.29	119	100
1960-61 Avg. ^a										
1. Mo. 58-3249 ^b	34.9	1.10	.94		85	-----	---	4.36	116	100
2. Rex	35.0	1.12	.94		84	-----	---	4.05	112	100
3. Auburn 56	35.5	1.10	.94		85	-----	---	4.50	119	100
1961										
1. Mo. 58-432	35.0	1.13	.98		87	-----	---	4.28	118	100
2. Mo. 58-3249	34.7	1.11	.95		86	-----	---	4.50	118	100
3. Rex	35.0	1.13	.95		84	-----	---	3.89	116	100
4. Mo. 58-449	34.7	1.11	.93		84	-----	---	4.25	120	100
5. Dixie King	34.7	1.12	.96		86	-----	---	4.44	122	100
6. Auburn 56	34.7	1.09	.93		85	-----	---	4.55	121	100
7. Delta Queen	35.7	1.17	1.02		87	-----	---	4.23	125	100
8. Stoneville 213	34.7	1.15	.98		85	-----	---	4.78	122	100
L.S.D. (.05)		.04						.28	6	

^aT₁ and E₁ averages for 1959-60; Standard yarn skein strength and manufacturing performance averages for 1960-61.

^b1960 data were averages between Mo. 58-432 and Mo. 58-449 (1960).

Table 3. Lint Cotton Yields for Varieties and New Strains on Loam Soils Infested With Verticillium Wilt (1959-61)^a.

Variety or Strain	Total Lint Yield		Earliness		Disease Reaction				Lint % Seedcot- ton/Boll	
	Lbs/A		Lint-Ist. Picking		Bacterial Blight		Fusarium		Verticillium	
	Lbs/A		% Crop		Rating		Wilt		% Incid.	
1959-61 Average^b										
1. Mo. 58-321	834	675	81	---	S	---	37.0	44.0	36.9	6.5
2. Rex	827	670	81	---	R	---	8.0	47.0	35.7	6.8
1960-61 Avg.^c										
1. Mo. 58-3249 ^d	891	667	75	1.6	S	1.6	5.8	44.2	35.8	6.9
2. Mo. 58-321	880	642	77	1.4	S	1.4	71.6	41.9	36.6	6.7
3. Rex	849	613	72	0	R	0	9.0	50.5	35.7	7.0
4. Stoneville 7	838	512	61	.8	S	.8	65.7	48.1	36.7	6.2
5. Deltapine-SL	771	457	59	.4	S	.4	72.0	47.3	36.4	6.0
6. Auburn 56	760	503	66	1.2	S	1.2	7.2	51.6	35.0	6.4
7. Fox 4	722	497	69	1.0	S	1.0	32.6	57.9	35.9	6.2
1961										
1. Mo. 58-449	1,022	759	74	3.7	S	3.7	1.2	44.8	36.2	6.8
2. Mo. 58-321A	1,003	633	63	2.7	S	2.7	---	34.3	36.5	6.5
3. Mo. 58-432	985	621	63	2.7	S	2.7	.3	33.8	35.4	6.9
4. Mo. 58-3249	965	627	65	3.3	S	3.3	.0	39.4	35.8	6.8
5. Mo. 58-321	896	526	59	2.7	S	2.7	---	41.4	36.3	6.4
6. Rex	888	504	57	.0	R	.0	1.7	49.3	35.3	6.7
7. Auburn 56	874	502	57	2.3	S	2.3	.7	38.5	35.2	6.5

Table 3. CONTINUED

Variety or Strain	Total Lint		Earliness		Bacterial Blight			Disease Reaction			Boll Size	
	Yield		Lint-Ist. Picking		Rating		Fusarium		Verticillium		Grams	
	Lbs/A		Lbs/A	% Crop			% Incid.	% Incid.	% Incid.	% Incid.	Lint	Seedcot-
											%	ton/Boll
8. Stoneville 213	848		423	50	S	1.7	14.4	47.1	36.5	6.2		
9. Deltapine-SL	791		352	45	S	.8	100.0	45.2	35.6	6.2		
10. Stoneville 7	765		354	46	S	1.7	59.6	34.8	35.9	6.0		
11. Dixie King	726		267	37	S	2.0	.5	40.0	35.3	6.9		
12. Delta Queen	710		305	43	S	2.3	2.1	36.0	35.7	6.0		
13. Fox 4	645		322	50	S	2.0	30.2	53.8	35.3	6.2		
L. S. D. (.05)	154		142									

^aDorena (1959), Sikeston (1960) and Dry Bayou (1961).

^b1959-60 averages for fusarium wilt incidence from Diehlstadt.

^c1960 data for fusarium wilt from Diehlstadt.

^d1960 data were averages between Mo. 58-432 and Mo. 58-449 (1960).

Table 4. Fiber Properties of Cotton Varieties and New Strains Grown on Loam Soils Infested With Verticillium Wilt (1959-61).

Variety or Strain	Staple 1/32 Ins.		Length Upper Half Mean Ins.		Unif. Ratio %	Strength Tenacity T ₁		Elon- gation E ₁	Fineness Standard Yarn Skein Strength 27 tex (22's) (Lbs.)		Spinning Performance Mfg. Perf.	
	Ins.	Ins.	Ins.	Ins.		T ₁	Mic.		Mic.	Mic.	Mic.	
1959-61 Avg. ^a												
1. Mo. 58-321	35.6	1.18	1.01	1.01	86	1.95	7.3	4.57	126	100		
2. Rex	35.5	1.14	.93	.93	82	1.63	7.1	3.89	115	100		
1960-61 Avg. ^b												
1. Mo. 58-3249 ^c	35.8	1.14	.97	.97	85	1.83	7.5	4.07	122	100		
2. Mo. 58-321	35.9	1.19	1.01	1.01	85	1.97	7.1	4.58	127	100		
3. Rex	35.7	1.16	.95	.95	82	1.65	6.8	3.90	116	100		
4. Stoveville 7	36.2	1.17	1.00	1.00	85	1.80	7.4	4.69	---	---		
5. Deltapine-SL	36.4	1.18	.98	.98	83	1.89	8.7	4.23	---	---		
6. Auburn 56	35.8	1.14	.97	.97	85	1.77	7.6	4.28	121	100		
7. Fox 4	36.2	1.16	1.01	1.01	87	1.77	7.3	4.55	---	---		
1961												
1. Mo. 58-449	34.3	1.12	.92	.92	82	---	---	---	4.01	120	100	
2. Mo. 58-321A	34.7	1.19	1.03	1.03	87	---	---	---	4.61	130	100	
3. Mo. 58-432	35.0	1.13	.95	.95	84	---	---	---	4.06	127	100	
4. Mo. 58-3249	34.7	1.14	.98	.98	86	---	---	---	4.08	125	100	
5. Mo. 58-321	35.0	1.19	1.02	1.02	86	---	---	---	4.47	130	100	
6. Rex	34.7	1.17	.96	.96	82	---	---	---	3.85	121	100	
7. Auburn 56	35.0	1.15	.99	.99	86	---	---	---	4.19	120	100	
8. Stoneville 213	34.7	1.16	.98	.98	84	---	---	---	4.50	123	100	

Table 4. Continued

Variety or Strain	Staple		Length		Unif. Ratio %	Strength		Fineness Mic.	Spinning Performance		
	Ins.	1/32	Upper	Half Mean		Mean	Tenac- ity T ₁		Elong- ation E ₁	Standard Yarn Skein Strength 27 tex (22's)	Mfg. Perf.
9. Deltapine-SL	35.0		1.17		.99	.85	---	---	4.32	133	100
10. Stoneville 7	35.0		1.17		.99	.85	---	---	4.52	122	100
11. Dixie King	34.7		1.16		1.00	.86	---	---	4.11	132	100
12. Delta Queen	35.3		1.19		1.00	.84	---	---	3.95	131	100
13. Fox 4	35.3		1.16		1.02	.88	---	---	4.42	134	100
L.S.D. (.05)			.04		.05				.23	6	

^aT₁ and E₁ averages for 1959-60.

^bT₁ and E₁ 1960 only.

^c1960 data were averages between Mo. 58-432 and Mo. 58-449 (1960).

Table 5. Lint Cotton Yields for Varieties Grown on Sandy Loam Soils at Portageville, Missouri, 1960-61.

Variety or Strain	Total Lint Yield		Earliness		Bacterial Blight		Disease Reaction		Verticillium		Lint		Boll Size
	Lbs/Acre	Yield	Lbs/Acre	% Crop	Rating	Incid.	Fusarium		Wilt ^b		%	%	Grams Seedcot- ton/Boll
							% Incid.	% Incid.	Wilt ^a	Incid.			
1. Mo. 58-3249 ^c	1,030	807	78	78	S	4.0	4.5	41.8	35.8	7.2			
2. Rex	1,004	779	78	78	R	.9	5.3	43.0	35.3	7.2			
3. Fox 4	966	623	64	64	S	3.2	31.4	64.4	36.0	6.6			
4. Dixie King	950	692	73	73	S	3.4	29.5	42.8	35.9	8.1			
5. Stoneville 3202	949	697	73	73	S	3.5	84.8	78.7	35.7	6.2			
6. Stoneville 7	948	605	64	64	S	2.7	62.7	52.1	37.0	6.5			
7. Stardel	933	684	73	73	S	3.5	95.9	75.2	37.2	5.9			
8. Empire W.R.	923	688	75	75	S	3.4	19.8	63.3	34.4	8.1			
9. Coker 124B	918	615	67	67	S	3.9	19.8	56.9	35.5	6.7			
10. Auburn 56	914	641	70	70	S	3.9	3.6	53.7	36.1	7.0			
11. Deltapine-SL	890	573	64	64	S	3.1	86.0	53.0	37.8	6.3			
12. Delfos 9169	875	622	71	71	S	3.5	55.0	64.8	33.7	7.5			
13. Deltapine 15	863	555	64	64	S	2.7	84.4	45.5	37.0	6.3			
14. Lankart 57	811	574	71	71	S	3.2	62.9	52.3	35.5	9.4			
15. Coker 100A	801	490	61	61	S	4.0	16.5	53.7	37.1	6.6			
16. Acala 4-42	600	418	70	70	S	4.5	35.5	37.3	36.4	8.1			

^aFrom fusarium wilt nursery at Diehlstadt.

^bFrom verticillium wilt nursery at Sikeston (1960); Dry Bayou (1961); and Portageville (1960).

^cData for 1960 from averages between Mo. 58-432 and Mo. 58-449 (1960).

Table 6. Fiber Properties of Cotton Varieties Grown at Portageville, Missouri, 1960-61.

Variety or Strain	Staple		Length		Unif. Ratio %	Fineness		Spinning Performance	
	1/32	Ins.	Upper Half	Mean		Mean	Ins.	Skein Strength	Standard Yarn
		Ins.	Ins.	Ins.	Ins.	Mic.	27 tex (22's)	(Lbs.)	Perf.
1. Mo. 58-3249 ^a	35.5	1.14	1.14	.98	86	4.24	122	100	
2. Rex	35.5	1.14	1.14	.95	83	3.95	116	100	
3. Fox 4	35.7	1.17	1.17	1.01	86	4.90	127	100	
4. Dixie King	35.4	1.16	1.16	.99	85	4.25	129	100	
5. Stoneville 3202	34.7	1.10	1.10	.94	85	4.37	110	100	
6. Stoneville 7	35.5	1.17	1.17	1.00	85	4.67	124	100	
7. Stardel	35.4	1.17	1.17	1.02	87	4.41	131	100	
8. Empire W.R.	35.9	1.17	1.17	.99	85	3.75	131	100	
9. Coker 124B	35.9	1.19	1.19	1.01	85	4.41	125	100	
10. Auburn 56	35.3	1.14	1.14	.98	86	4.42	121	100	
11. Deltapine-SL	35.7	1.19	1.19	1.02	86	4.60	127	100	
12. Delfos 9169	36.0	1.23	1.23	1.02	83	4.10	125	100	
13. Deltapine 15	35.7	1.16	1.16	.99	85	4.29	129	100	
14. Lankart 57	35.2	1.11	1.11	.95	86	4.57	108	100	
15. Coker 100A	35.9	1.16	1.16	.97	84	4.31	123	100	
16. Acala 4-42	35.9	1.12	1.12	.99	88	4.06	145	100	

^aData for 1960 from averages between Mo. 58-432 and Mo. 58-449.

Table 7. Average Lint Yields for Mo. 58-432, Mo. 58-449, Mo. 58-3249, Rex and Auburn 56 Grown In Tests in Southeast Missouri (1959-61).

Variety or Strain	Total Lint		Earliness		Disease Reaction			Lint		Boll Size	
	Yield Lbs/A		Lint-1st. Picking Lbs/A	% Crop	Bacterial Blight Rating	Fusarium ^c Wilt % Incid.	Verticillium Wilt ^d % Wilt	Lint %	Cottonseed /Boll	Grams	
1959-61 Avg. ^a											
1. Mo. 58-432	878		656	75	S	3.0	8.9	52.0	36.4	6.9	
2. Mo. 58-449	859		669	78	S	3.2	10.8	50.8	36.5	6.7	
3. Rex	833		617	74	R	.4	19.6	44.8	36.5	6.8	
4. Auburn 56	760		496	65	S	3.1	12.2	58.5	35.8	6.4	
1961 Avg. ^b											
1. Mo. 58-3249	942		654	69	S	3.9	.0	39.4	36.4	7.0	
2. Rex	850		550	65	R	.5	1.7	49.3	35.7	6.7	
3. Auburn 56	837		524	63	S	3.7	.7	38.5	35.7	6.5	

^aAverages for 6 tests; Diehlstadt (1959-61); Sikeston (1960); Portageville (1960); Dry Bayou (1961)

^bAverages for 3 tests; Diehlstadt, Dry Bayou and Portageville (1961).

^cFrom Diehlstadt (1959-61).

^dFrom Dorena (1959); Sikeston (1960); Portageville (1960); and Dry Bayou (1961).

Table 8. Fiber Properties for Mo. 58-432, Mo. 58-449, Mo. 58-3249, Rex and Auburn 56 Grown in Tests in Southeast Missouri (1959-61).

Variety or Strain	Staple		Length		Unif. Ratio %	Tenac- ity T ₁	Strength		Fineness Mic.	Spinning Performance	
	Ins.	1/32	Upper Half Mean	Mean			Ins.	Ins.		Elongation E ₁	Standard Yarn Skein Strength 27 tex (22's) (Lbs.)
1959-61 Avg. ^a											
1. Mo. 58-432	35.2		1.12	.96	86	1.75	8.3	4.12	118	100	
2. Mo. 58-449	35.3		1.11	.93	84	1.78	7.9	4.12	120	100	
3. Rex	35.3		1.13	.93	82	1.62	8.1	3.97	113	100	
4. Auburn 56	35.5		1.11	.95	86	1.74	8.4	4.32	119	100	
1961 Avg. ^b											
1. Mo. 58-3249	34.8		1.13	.98	87	-----	---	4.32	122	100	
2. Rex	34.9		1.15	.96	83	-----	---	3.89	119	100	
3. Auburn 56	34.7		1.13	.97	86	-----	---	4.45	122	100	

^aAverage for 6 tests (1959-61).

^bAverage for 3 tests (1961).