Research Report No. 14
February, 1965

COTTON
1964

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Performance of Cotton Varieties in North Carolina

Cotton is making an important comeback as a major agricultural crop in North Carolina. This comeback is due in part to an increase in more efficient production practices, better insect control and higher yielding varieties. All these factors add up to more profitable cotton production.

With the shift to mechanization, there is a need for cottons that are better adapted for mechanical harvesting. Rex Smoothleaf is an example of breeding for mechanical picking. Under certain conditions, the smooth-leaf character gives this variety a distinct grade advantage over the original Rex when both are harvested mechanically. Breeders are constantly searching for genetic characters which will be advantageous to the cotton producer.

Through the continued effort of plant breeders, more varieties are being developed to suit the various environmental conditions and production systems which are present in North Carolina. The variety picture has changed notably within recent years and indications are that this trend will continue. Today, several high yielding varieties are available for planting. Varieties with more disease resistance are being developed which will be beneficial to North Carolina cotton producers.

The cotton producer thus has a choice of varieties for planting, and his success in production may be influenced considerably by his selection. Choice of variety is influenced not only by production potential, but also by suitability for mechanical harvesting, earliness of maturity, quality of fiber, storm resistance, and disease resistance.

This report provides information on the performance of commercial varieties and experimental lines grown in various geographical areas of the state. This information serves as a guide to cotton breeders in

their future development of varieties, to agricultural workers, and to growers for use in choosing a variety to plant.

The results of the North Carolina Official Cotton Variety Trials for the 1964 season, and summaries of the tests conducted during the past three years are presented in this report.

EXPERIMENTAL PROCEDURE

Experimental lines and commercial varieties developed by public and private agencies are included in this report. One requirement for acceptance is quantitative data from experiments in which the proposed entry is compared with recognized varieties. These data must reveal meritorious performance in order for a variety to qualify for the tests.

Any individual or firm may make application for having entries included. A fee is charged on an entry basis. Personnel of the testing program may include entries about which further information is desired.

Agencies Sponsoring Entries

Auburn University Agricultural Experiment Station, Auburn, Alabama

Auburn 56 Pedigreed Seed Association, Troy, Alabama

Coastal Plain Experiment Station, U.S.D.A., Tifton, Georgia

Coker's Pedigreed Seed Company, Hartsville, South Carolina

Cotton Hybrid Research Inc., Athens, Georgia

DeKalb Agricultural Association, Inc., Bogart, Georgia

Delta and Pine Land Company, Scott, Mississippi

Empire Pedigreed Seed Company, Haralson, Georgia

Lee Wilson and Company, Wilson, Arkansas

McNair Seed Company, Laurinburg, North Carolina

North Carolina Agricultural Experiment Station, Raleigh, N. C.

Stoneville Pedigreed Seed Company, Stoneville, Mississippi

Test Locations

Four locations were used in 1964 with two in the Coastal Plain Area and two in the Piedmont as shown in Figure 1. All of the tests were located on private farms.[1/]

Seasonal Conditions

The 1964 growing season was not considered good for the maximum production of cotton. Considerable rain during the usual harvest period caused the fiber properties to deteriorate.

The Scotland County test was planted in good soil conditions and a good stand was obtained. Only a few plots did not have a complete stand. Fair growing conditions prevailed throughout the year and good yields were recorded.

Two replications of the Halifax County test were discarded due to a low place in the field causing a considerable amount of water to stand on these plots after planting and during the growing season. The stand obtained was spotted at the start of the season but these missing spots germinated later and the stand was considered adequate to record good yields.

The Anson County test had good growing conditions and good stands. This was considered to be the best test, however, workers of the cooperator harvested the test inadvertently and the test had to be discarded.

Considerable variation in stands was recorded at the Rutherford County location. The seed germinated but began dying and continued to die for a period of about six weeks. During this period of dying,

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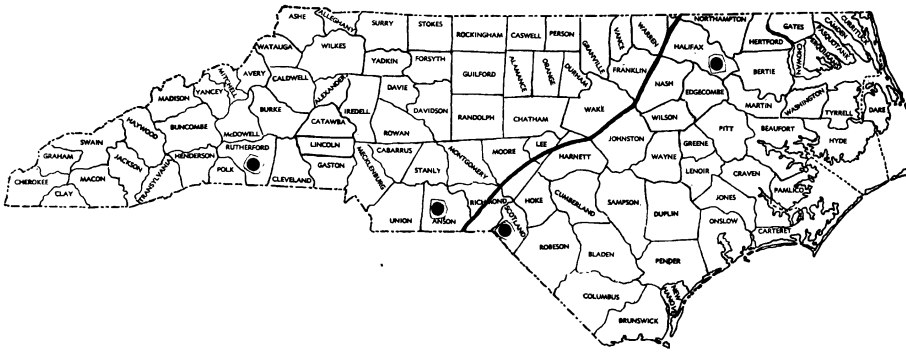
1/ The co-operative spirit and civic-minded service rendered by the farmers who provided land and the necessary cultural practices for these trials and the co-operation of the County Extension Chairman are gratefully acknowledged.

Figure 1. Locations of N. C. Cotton Trials



Scotland County
Gilchrist Farms, A. F. McMillan, Manager, Laurinburg, N. C.
Scotland County Extension Chairman J. B. Caudill.

Anson County
Carl Rayfield, Route 3, Wadesboro, N. C.
Anson County Extension Chairman J. R. Potter, Jr.

Rutherford County
Van McDaniels, Ellenboro, N. C.
Rutherford County Extension Chairman J. A. Crawford.

Halifax County
W. L. Pickett, Scotland Neck, N. C.
Halifax County Extension Chairman Clyde Peedin

dry moisture conditions existed although this is not believed to be the sole reason for the cotton to die. The final stands were very spotted and irregular for most plots. This test was harvested but due to the considerable variation of the same varieties in various replications, the data could not be used.

Cultural Practices

Cultural practices, such as seed bed preparation, date of planting, fertilization, cultivation and insect control measures were in accord with good farming practices. These are listed for each test in Table 1. Planting, harvesting and yield measurements were directly supervised by personnel of the North Carolina Agricultural Experiment Station. The Scotland County test was harvested mechanically and the Halifax County test was hand picked. Due to a large number of unopened bolls at the first picking, the Halifax County test was picked a second time by hand.

Criteria for Evaluating Cotton Varieties

A randomized block design with six replications was used at each location.[2/] Plot size at all locations was two rows 27 feet long. Row spacing was the same at each location as shown in Table 1.

Yield of Seed Cotton: The plots were harvested individually and average pounds of seed cotton per acre were calculated.

Yield of Lint: This was calculates using the lint percentage of each plot and converting the pounds of seed cotton per plot to pounds of lint per acre.

2/ Statistical analyses were made in the Statistical Laboratory under the supervision of John O. Rawlings. This assistance is gratefully acknowledged.

Table 1. Cultural practices for cotton performance trials.

Area and co-operator	Fertilizer lbs/A	Herbicide pre-emerge	Row Spacing in.	Date of Planting	Date of harvest
Scotland County A.F. McMillan	400 Drill 10-20-20				
	250 10-20-20	Treflan	40"	May 6	Oct. 22
Halifax County W.L. Pickett	250 10-20-20	Treflan	40"	April 23	Oct. 7 Nov. 4
Anson County Carl Rayfield	250 10-20-20	Treflan	40"	April 29	Test Discarded
Rutherford County Van McDaniels	250 10-20-20	Treflan	40"	May 13	Dec. 2
	400 Drill 10-20-20				

Lint Percentage: A 50 boll sample was taken from each plot at each location. The weight of lint ginned from this sample of seed cotton was expressed as a percentage of the weight of seed cotton.

Staple Length:[3/] A Federal Cotton Inspector determined the staple length on the ginned samples of each plot.

Bolls per Pound of Seed Cotton: The number of bolls required to make one pound of seed cotton was determined by weighing the 50 boll samples from each plot at each location and converting it to a pound basis.

3/ Acknowledgement is given to the Cotton Division, Agricultural Marketing Service, U.S.D.A., Raleigh, North Carolina, for making staple length determinations.

Span Length: The length which a certain percentage of fibers from the original fiber population would span when caught at random along the length of the fiber.

Uniformity Ratio: Ratio of 50% span length to 2.5% span length.

Micronaire: The micronaire test is a test for fineness of the fiber. The micronaire instrument is used to measure the resistance to the passage of air through a 50 grain sample of cotton compressed to a given volume.

Tensile Strength: This indicates the tensile strength of the fiber in pounds per square inch.

Key to Fiber Test Results

Fibrograph (Uniformity Ratio)	Micronaire (Fib. wt./in. - Micrograms)
45 and above - Uniform	2.9 and below - Very fine
40 - 44.9 - Average	3.0 - 3.9 - Fine
39.0 and below - Irregular	4.0 - 4.9 - Average
	5.0 - 5.9 - Coarse
	6.0 and above - Very coarse

Pressley (Tensile Strength, 1000 psi)

96 and above - Very strong
86 - 95 - Strong
76 - 85 - Average
66 - 75 - Fair
65 and below - Weak

The operations and measurements required for the development of data on yield and such other agronomic characters as boll size and lint percentage were performed by personnel at the experiment station. Fiber samples from all replications at all locations were sent to the North Carolina Department of Agriculture, Markets Division, Engineering Section for analyses[4/].

4/ Fiber analysis was made in the Markets Division, Engineering Section, N.C.D.A., under the supervision of Charles B. Elks. The assistance of Mr. Elks and his staff is gratefully acknowledged.

RESULTS

Varietal performance may vary from year to year and annual results may seem inconsistant; therefore, performance data obtained over a period of years are more reliable than for any one year.

The data presented in Tables 2 and 3 are summary data for various years and locations and indicate how varieties have been performing over a period of years at various locations. A three year average performance is shown for lines and varieties in Table 2. Five of the eight varieties tested over a three year period averaged over 800 pounds of lint per acre. These were: Coker Carolina Queen, Dixie King II, DeKalb 108, DeKalb 220 and Rex.

In Table 3, entries are compared which have been in the tests for the past two years. Nine of the twelve varieties tested yielded over 800 pounds of line per acre. The range in yield of these entries was very narrow. There were differences in lint percent for the varieties tested. The range was from 34.8 for Auburn 56 to 38.8 for Coker 61-230, with most entries averaging about 36 to 37%. Bolls per pound of seed cotton ranged from 60 to 79 for Empire WR-61 and McNair 1032, respectively. Information on fiber properties is also presented in this table. McNair 1032, Coker Carolina Queen and Dixie King II had tensile strength over 80.

The data in Table 4 are a summary of the two locations harvested in 1964. The experimental line Coker 61-230 was at the top of the test on yield of lint, although there were no statistical differences in any of the entries. The varieties Coker 61-230, McNair 1032R, Coker 62-215 and Coker 62-207 had yields of lint in excess of 1100 pounds. There were differences in lint percent and staple length for the varieties. Lint percent for all varieties ranged from 33.6 to 39.2. Bolls per pound of seed cotton ranged from 59 to 79.

Fiber properties, Table 4, are also presented in this report from each of the two tests. Each of these properties are important to the cotton mills and should be studied as they relate to varieties. For example, tensile strength, "Pressley", indicated that TH-149 had a strong fiber although its yield is only moderate. Most varieties and lines showed good uniformity for fiber length. Varieties also differed for fiber elongation and micronaire. Fiber properties are important to the manufacturer and should be considered in choosing a variety for quality.

Individual location data are presented in Tables 5 and 6. Although there were statistical differences for most characters in the individual locations, the performance of a single location can be misleading. For example, there was a highly significant variety X location interaction for lint pounds and pounds of seed cotton. This indicates that varieties failed to respond the same from location to location. There is no definite pattern from location to location, so it would be more reliable to use the data averaged across locations in deciding what variety to plant.

In selecting a variety for planting, characteristics that influence a profitable production should be studied. Amount of lint produced per acre is an important criterion, yet the variety should be resistant to prevalent diseases, particularly fusarium wilt. If the cotton is to be mechanically harvested, then it should mature uniformly and be compact. Seed quality is most important to the successful production of cotton. Weak deed do not perform well under adverse weather conditions at planting time. Other plant characteristics considered in selecting a variety of cotton are storm resistance, plant type and boll size. Lint characteristics, such as staple length, gin turnout, and fiber quality affect prices, harvesting costs and market demands.

Table 2. Summary of cotton performance trials. Three year average - 1962-1963-1964. Average of 9 locations.

Variety or line	Lint lbs/A	Seed cotton lbs/A	Lint %	Staple length in.	Bolls/lb. of seed cotton
Coker Carolina Queen	884	2401	37.0	1 3/32	73
Dixie King II	823	2236	37.0	1 3/32	60
DeKalb 108	813	2286	35.7	1 1/8	66
DeKalb 220	805	2217	36.5	1 1/8	69
Rex	804	2256	36.3	1 3/32	65
Mean of Test	800	2212	36.4	1 3/32	71
Auburn 56	783	2234	34.7	1 3/32	70
Coker 100A (WR)	767	2145	36.0	1 1/8	73

Table 3. Performance of cotton varieties. Two year average - 1963-1964. Average of 6 locations.

Variety or line	Lint lbs/A	Seed cotton lbs/A	Lint %	Staple length in.	Bolls/lb. of seed cotton	Fiber Properties					
						Span Length			Uni-formity Ratio	Micronaire Fib. wt./in. micrograms	Tensile Strength "Pressley"
						66.7%	50%	2.5% (expressed in in.)			
Coker 61-230	964	2498	38.8	1 3/32	78	.38	.50	1.07	47	4.8	77.6
McNair 1032	900	2440	36.9	1 1/16	79	.38	.50	1.04	48	4.6	81.8
Coker Carolina Queen	882	2387	37.2	1 3/32	75	.38	.52	1.08	47	4.6	80.6
Dixie King II	859	2306	37.5	1 3/32	62	.38	.50	1.04	48	4.6	80.4
Rex	844	2350	36.2	1 3/32	69	.38	.49	1.06	46	4.2	76.7
Mean of Test	836	2303	36.4	1 3/32	72	.38	.50	1.07	47	4.4	79.8
DeKalb 108	822	2322	35.5	1 1/8	68	.40	.51	1.08	48	4.3	78.2
Deltapine 7139	808	2167	37.6	1 1/8	78	.39	.50	1.06	48	4.5	76.8
DeKalb 220	801	2222	36.4	1 1/8	72	.39	.50	1.08	47	4.3	77.8
Coker 60-111	800	2228	36.2	1 1/8	70	.40	.52	1.12	48	4.2	77.4
Auburn 56	781	2269	34.8	1 1/16	71	.38	.50	1.06	48	4.4	76.6
Empire WR-61	776	2202	35.5	1 1/8	60	.38	.51	1.08	47	4.1	79.7
Coker 100A (WR)	775	2159	36.1	1 1/8	74	.40	.52	1.10	46	4.4	77.3

Table 4. Performance of cotton varieties. Average of two locations - Scotland and Halifax Counties - 1964

Variety or line	Lint lbs/A	Seed cotton lbs/A	Lint %	Staple length in,	Bolls/lb. of seed cotton	Fiber Properties: Span Length 66.7% (expressed in in.)	Span Length 50% (expressed in in.)	Span Length 2.5% (expressed in in.)	Uniformity Ratio	Micronaire Fib. wt./in. micrograms	Tensile Strength "Pressley"
Coker 61-230	1184	3023	39.2	1 3/32	78	.39	.51	1.06	48	4.9	76.0
McNair 1032R	1178	3112	37.8	1 3/32	79	.38	.49	1.01	49	4.7	79.5
Coker 62-215	1106	2856	38.7	1 1/8	67	.38	.50	1.05	48	4.5	77.0
Coker 62-207	1102	2889	38.2	1 1/8	73	.38	.50	1.06	48	4.5	79.6
McNair 1032	1096	2915	37.6	1 3/32	79	.39	.50	1.03	49	4.5	79.4
Coker 62-121	1080	2820	38.3	1 1/8	72	.38	.51	1.08	47	4.3	77.2
Coker Carolina Queen	1078	2884	37.4	1 3/32	71	.38	.51	1.07	47	4.5	79.6
Stoneville 213	1058	2803	37.8	1 3/32	75	.39	.50	1.04	48	4.7	75.8
CHR 100	1048	2990	35.1	1 1/8	66	.39	.51	1.08	48	4.3	76.8
Dixie King II	1019	2677	38.0	1 3/32	60	.38	.50	1.04	48	4.5	78.5
Mean of Test	1013	2736	37.0	1 3/32	71	.39	.51	1.06	48	4.4	77.7
Rex	1005	2737	36.7	1 3/32	67	.38	.49	1.05	47	4.1	75.4
TH 149	997	2728	36.5	1 1/8	62	.41	.54	1.12	49	4.4	87.0
Rex Smoothleaf	997	2782	35.9	1 3/32	67	.38	.50	1.04	48	4.2	75.5
Dixie King 6374	985	2513	39.1	1 3/32	72	.38	.49	1.02	48	4.6	75.4
Deltapine 7139	982	2560	38.5	1 1/8	76	.39	.50	1.04	49	4.6	75.2
DeKalb 108	971	2710	35.8	1 1/8	69	.40	.52	1.07	48	4.2	76.0
CHR 100B	971	2641	36.8	1 3/32	72	.38	.49	1.04	47	4.2	77.9
Coker 60-111	956	2602	36.7	1 1/8	68	.40	.53	1.12	48	4.2	75.3
DeKalb 220	940	2549	36.9	1 1/8	72	.40	.51	1.07	48	4.2	74.5
Auburn 56	936	2708	34.6	1 3/32	68	.38	.50	1.04	49	4.3	73.4
Coker 100A (WR)	926	2547	36.2	1 1/8	72	.39	.51	1.08	47	4.4	75.1
Empire WR-61	915	2569	35.6	1 1/8	59	.39	.51	1.07	48	4.0	77.5
Coker 61-413	894	2435	36.7	1 1/8	79	.40	.53	1.11	48	4.0	82.6
Atlas 59-182	886	2618	33.6	1 1/8	71	.39	.51	1.04	49	4.3	84.7
L. S. D. (.05)	NS	NS	1.3	.5/32	6	.02	.02	.02	1	.2	3.4
(.01)	NS	NS	1.8	.7/32	8	.03	.03	..03	2	.3	4.7
C. V. (%)	13	13	4	2	7	4	3	2	2	5	3

L. S. D. (.05) NS NS 1.3 .5/32 .4 .02
Table 5. Performance of cotton varieties - Scotland County - 1964.

Variety or line	Lint lbs/A	Seed cotton lbs/A	Lint %	Staple length in.	Bolls/lb. of seed cotton	Fiber Properties: Span Length 66.7% (expressed in in.)	Span Length 50% (expressed in in.)	Span Length 2.5% (expressed in in.)	Uniformity Ratio	Micronaire Fib. wt./in. micrograms	Tensile Strength "Pressley"
McNair 1032R	1131	2974	38.1	1 3/32	83	.40	.51	1.02	50	4.7	79.5
Coker 62-207	1110	2888	38.4	1 1/8	75	.40	.52	1.08	49	4.5	78.7
Coker 61-230	1107	2796	39.6	1 3/32	78	.41	.53	1.07	50	4.9	75.8
Coker 62-215	1105	2838	39.0	1 1/8	71	.41	.54	1.08	50	4.6	75.7
McNair 1032	1060	2818	37.6	1 3/32	82	.41	.52	1.04	50	4.5	78.4
Coker 62-121	1054	2732	38.6	1 1/8	77	.40	.53	1.09	49	4.3	75.9
Coker Carolina Queen	1047	2787	37.6	1 1/8	75	.41	.54	1.09	49	4.4	78.2
CHR 100B	1042	2812	37.1	1 1/8	75	.40	.51	1.05	49	4.1	77.4
Dixie King 6374	1030	2584	39.8	1 3/32	74	.40	.51	1.03	50	4.8	75.0
Coker 100A (WR)	1029	2814	36.6	1 5/32	74	.41	.54	1.10	49	4.3	74.4
Coker 60-111	1027	2726	37.8	1 1/8	70	.42	.55	1.12	49	4.3	75.2
Stoneville 213	1024	2686	38.1	1 1/8	74	.40	.52	1.05	50	4.7	74.4
Deltapine 7139	1010	2578	39.2	1 1/8	74	.40	.52	1.05	50	4.5	72.8
Mean of Test	1002	2682	37.3	1 1/8	73	.41	.53	1.07	49	4.4	77.0
CHR 100	998	2764	36.1	1 1/8	67	.41	.54	1.09	49	4.2	76.0
Dixie King II	983	2576	38.0	1 3/32	60	.40	.52	1.04	50	4.5	77.3
TH 149	982	2690	36.4	1 1/8	65	.44	.57	1.13	50	4.4	88.4
Coker 61-413	968	2604	37.2	1 1/8	82	.42	.55	1.12	49	4.0	84.4
Rex	967	2597	37.2	1 3/32	69	.40	.52	1.06	49	4.1	74.2
Rex Smoothleaf	959	2665	36.0	1 1/8	69	.40	.52	1.05	49	4.2	74.3
DeKalb 108	939	2584	36.4	1 1/8	68	.43	.55	1.10	50	4.2	74.4
Auburn 56	911	2580	35.3	1 3/32	70	.39	.51	1.04	49	4.3	71.9
Empire WR-61	907	2526	35.9	1 1/8	62	.42	.54	1.08	50	4.1	76.7
DeKalb 220	894	2423	36.9	1 1/8	76	.42	.54	1.08	50	4.2	73.9
Atlas 59-182	762	2320	32.9	1 1/8	72	.40	.53	1.06	50	4.2	85.7
L. S. D. (.05)	118	302	1.3	.7/32	6	.02	.02	.02	NS	.2	1.9
(.01)	156	399	1.7	1/32	8	.02	.02	.03	NS	.3	2.5
C. V. (%)	10	10	3	2	7	4	3	2	2	5	2

Table 6. Performance of cotton varieties - Halifax County - 1964.

Variety or line	Lint lbs/A	Seed cotton lbs/A	Lint %	Staple length in.	Bolls/lb. of seed cotton	Fiber Properties: Span Length 66.7% (expressed in in.)	Span Length 50% (expressed in in.)	Span Length 2.5% (expressed in in.)	Uniformity Ratio	Micronaire Fib. wt./in. micrograms	Tensile Strength "Pressley"
Coker 61-230	1300	3364	38.7	1 3/32	78	.36	.48	1.04	46	4.8	76.5
McNair 1032R	1247	3320	37.5	1 3/32	73	.35	.46	.98	47	4.6	79.6
McNair 1032	1150	3061	37.5	1 3/32	74	.36	.48	1.02	47	4.6	80.9
Coker Carolina Queen	1125	3028	37.2	1 3/32	64	.34	.46	1.04	44	4.6	81.7
CHR 100	1122	3329	33.6	1 3/32	64	.36	.48	1.06	45	4.4	77.8
Coker 62-121	1119	2951	37.9	1 3/32	65	.36	.48	1.07	44	4.4	79.0
Stoneville 213	1109	2980	37.2	1 3/32	75	.36	.48	1.02	46	4.7	77.8
Coker 62-215	1107	2883	38.2	1 3/32	66	.34	.45	1.02	44	4.5	79.0
Coker 62-207	1091	2891	37.7	1 3/32	69	.36	.48	1.05	46	4.5	81.1
Dixie King II	1072	2829	38.0	1 3/32	60	.35	.47	1.04	45	4.4	80.3
Atlas 59-182	1071	3066	34.8	1 1/8	70	.37	.48	1.03	47	4.5	83.3
Rex	1062	2947	36.0	1 3/32	64	.34	.45	1.02	44	4.1	77.2
Rex Smoothleaf	1054	2958	35.8	1 3/32	63	.36	.47	1.03	46	4.2	77.2
Mean of Test	1029	2818	36.5	1 3/32	68	.36	.47	1.04	45	4.4	78.7
TH 149	1021	2785	36.5	1 1/8	57	.38	.50	1.10	46	4.5	85.0
DeKalb 108	1020	2900	35.0	1 3/32	69	.35	.46	1.03	45	4.2	78.4
DeKalb 220	1008	2737	36.8	1 3/32	66	.36	.47	1.04	45	4.2	75.3
Auburn 56	973	2899	33.6	1 3/32	65	.37	.49	1.02	48	4.3	75.7
Deltapine 7139	941	2532	37.3	1 3/32	79	.37	.48	1.04	47	4.6	79.0
Empire WR-61	928	2632	35.2	1 3/32	54	.36	.47	1.06	45	4.0	78.6
Dixie King 6374	919	2408	38.1	1 1/16	70	.35	.46	1.02	46	4.5	76.0
CHR 100B	865	2384	36.3	1 3/32	67	.34	.46	1.02	45	4.2	78.6
Coker 60-111	849	2416	35.1	1 3/32	66	.38	.50	1.11	45	4.2	75.5
Coker 61-413	783	2182	35.9	1 1/8	75	.37	.50	1.10	45	4.0	80.0
Coker 100A (WR)	771	2146	35.7	1 3/32	70	.34	.46	1.05	44	4.4	76.2
L. S. D. (.05)	251	627	2.4	NS	7	.02	.02	.03	2	.2	3.8
(.01)	334	832	3.2	NS	10	NS	.03	.04	2	.3	5.1
C. V. (%)	17	16	5	1	8	5	3	2	3	3	3