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EFFECTS *of* SOME ENVIRONMENTAL FACTORS *on the* SEED *and* LINT *of* COTTON

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EFFECTS of SOME ENVIRONMENTAL FACTORS on the SEED and LINT of COTTON

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THE value of a crop of cotton is closely related to the grade or quality of the seed and fiber.

Percentage of oil is one of the most important factors determining the value of the seed, while percentage of protein is the most important factor determining the value of the meal. In case of cotton fibers, their value is largely determined by the size and strength of yarn they will produce. It has been shown by Turner *(1)*, Underwood *(2)*, Webb and Richardson *(3)*, and others that yarn size and strength are influenced greatly by the strength, length, weight per inch (fineness), and maturity of the fibers in a sample of cotton. No attempt is made in this publication to review all of the literature dealing with the factors of oil and protein content of seed, or the quality of the fibers.

The Alabama Agricultural Experiment Station in 1928 began a series of studies to determine the influence of environmental factors on the seed and fiber properties of cotton. The factors particularly studied were soil moisture, soil type, and fertilizers. In 1934 the project was enlarged and became a cooperative project between the Department of Agronomy and Soils of the Alabama Agricultural Experiment Station and the Division of Cotton and Other Fiber Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering, United States Department of Agriculture. It is the purpose of this publication to report the results obtained in this study.

The effects of soil moisture, soil type, fertilizers, and organic matter on weight of boll, number of seed per boll, weight per seed, weight of lint per seed, percentage of lint, percentage of oil in the seed, percentage of fuzz, percentage of protein in the seed, length of lint, breaking strength of lint, weight per inch, and maturity of the fibers are reported.

EXPERIMENTAL METHODS

Blossom and Boll Records

Blossoms were marked with numbered tags as they appeared. This number served as identification in all later studies. Each boll was harvested separately, and the cotton was allowed to reach uniform moisture content before any measurements were made.

Methods Used in Various Determinations

All the bolls from blossoms occurring on a given date on a plot or under a given treatment were combined. The seed cotton was weighed, and the cotton was then ginned on a roller gin for ginning boll lots. After ginning the seed were counted and the lint was weighed. The weight of seed, percentage of lint, average weight of seed, and average weight of lint per seed were calculated. The seed were analyzed for protein, fuzz, and oil. In the process of preparing the seed for analysis, the fuzz was removed with sulfuric acid. The loss in weight from treatment with sulfuric acid was computed as percentage of fuzz on the basis of the weight of the seeds before delinting. The hull was not removed from the seed; therefore, all determinations include the hull as part of the seed. Oil determinations were made by the use of an Abbe refractometer. The method used followed that of Coleman and Fellows *(4)*. The protein content was calculated from the nitrogen content, as determined by the standard Kjeldahl method. All determinations are on a moisture-free basis. The oil and protein calculations are on a fuzz-free seed basis. The protein is reported on an oil-free basis.

The method of measuring the length, fineness, and breaking strength of cotton was the one developed by Richardson, Bailey, and Conrad *(5)*. Maturity was determined by the polarized light method of Schwarz *(6)*. Blue and purple fibers were combined, and in this publication they are expressed as percentage of immature fibers.

All fiber measurements were made in a room with a constant temperature of 70° F. and at a relative humidity of 65°.

Soil Type Studies

Two soils of very different types were used. One soil was a Norfolk sandy loam taken from a field near Auburn, Alabama.

This is a shallow, infertile soil, coarse in texture, and very low in organic matter. The top soil is usually 4 to 8 inches deep and is underlaid by a friable, yellow clay. The other soil was classed as Deer Creek loam, which was brought from near Stoneville, Mississippi. This is a deep, fertile alluvial soil, fine in texture, rich in organic matter, and quite uniform. It was thought that the use of these two extreme types would show any measurable effects of soil type on the quality of cotton.

Large galvanized iron cans 30 inches in diameter and 24 inches deep, holding approximately 1,000 pounds of soil each, were used as containers. The cans were placed in a trench so that the tops were level with the surface of the soil and so arranged that they could be weighed. Two 8-inch layers of sub-soil and one 6-inch layer of top soil were placed in the cans in the order they occurred in the field. As the soil was placed in the can, it was compacted to approximately the same density as in the field.

The moisture content of the soil was not kept constant. After it had lost considerable moisture, but before the plants had begun to wilt, water was added until the water-holding capacity was reached. By adding water in this manner, it was possible to wet all of the soil in the containers and not limit the area of root growth.

Each can was fertilized at the rate of 500 pounds of nitrate of soda, 1,000 pounds of superphosphate, and 100 pounds of muriate of potash per acre.

Thirteen cans, containing two plants each, were used for each soil type. This gave a total of 26 plants in each soil type, from which results were obtained. Plants were grown outside of a trench to make conditions surrounding the plants in the containers as nearly normal as possible. This experiment was located adjacent to the plots used in soil moisture and fertilizer studies.

Soil Moisture and Fertilizer Studies

Field plots 20 by 20 feet in size, separated by 2-foot alleys, were used. Each plot was surrounded by a wall of galvanized iron placed 2 feet deep in the ground to prevent the plant roots from feeding outside of the plots. The galvanized iron was painted with an asphalt base paint before it was placed in the soil. The soil within the plots was not disturbed when placing the wall of galvanized iron.

Cotton was spaced 2 feet apart with two plants per hill, in rows 4 feet apart, giving 100 plants per plot. Cotton plants were grown in the alleys and on outside borders of all plots to approximate normal field conditions.

When it was desired to reduce the soil moisture, rain was kept off by means of a movable cover.

Various plots requiring additional moisture were irrigated when necessary to keep the moisture condition of the soil at the proper level (10 to 12 per cent). Water was applied at night or on a cloudy afternoon to prevent excessive water losses by evaporation. Each plot was laid off in 16 sections. Small mounds of soil were thrown up at the borders of these to confine the water and prevent it from forming pools in the lower areas. This made it possible to irrigate the plots uniformly. Water was measured by a standard water meter as it was applied to each plot.

Soil moisture records were obtained by taking samples of soil at three depths (0 to 8, 8 to 16, and 16 to 24 inches), so that the moisture content could be determined for 8-inch layers from 0 to 24 inches. The samples for soil moisture were taken from between the rows.

Other Field Studies

Experiments with fertilizers, varieties, and method of soil preparation were conducted at different places in the State. Details of each of these tests are discussed under the results.

Varieties

A pure line strain of Mexican Big Boll variety developed by the North Carolina Agricultural Experiment Station was obtained for use in this experiment. This is a typical variety of American upland cotton. The strain used, when grown under favorable conditions, produces a staple length of approximately 1⅛ inches. Comparisons with other varieties were made and are discussed in the results. The seed were obtained from the breeders of the respective varieties.

RESULTS

Seed Cotton Studies

Effect of Soil Moisture on Various Properties of Cotton, Experiment No. 1

The experiment to determine the effects of soil moisture was begun in 1928 on plots previously described. The soil used was a Norfolk sandy loam of medium fertility. Each plot received an application of 500 pounds of nitrate of soda, 1,000 pounds of superphosphate, and 100 pounds of muriate of potash per acre. All of the phosphate and potash and one-fourth of the nitrogen was applied in three bands before planting. One band of fertilizer was placed 2 inches below the seed, and two bands were placed at the side 6 inches from the seed and 2 to 3 inches below the seed. The remaining three-fourths of the nitrogen was applied as a side dressing after the cotton was thinned.

The cotton blooms were tagged each day. When the bolls were harvested, they were grouped for each date, i.e., all bolls from blooms occurring on a certain date were combined and used for the various tests and determinations.

The results averaged by years are given in Table 1, and by weeks in Appendix Table 1. These data show that adequate soil moisture resulted in cotton with a larger boll, slightly more seed per boll, heavier seed, larger weight of lint per seed, and smaller lint percentage than cotton with deficient soil moisture.

Effect of Fertilizer Treatment and Soil Moisture on Various Properties of Cotton, Experiment No. 2

In 1933 the experiment was expanded to include fertilizer and organic matter studies under two conditions of soil moisture. It was planned to measure the effect of either nitrogen, phosphorus, potash, organic matter, or soil moisture on the various characters studied. The treatments used were designed to produce extremes; that is, unusually high rates of application were contrasted with no application of the treatment under consideration. By this means it was hoped to determine extremes that might be produced by variation in soil treatment. Thus, any variation under practical farm conditions would produce less effects on the character measured.

Plots were prepared similar to those previously described. The

TABLE 1. EFFECT OF SOIL MOISTURE ON VARIOUS PROPERTIES OF COTTON FIBER AND SEED, MAIN STATION, AVERAGES 1928-32

Character measured	Moisture[1] condition of the soil	Years					5-year average
		1928	1929	1930	1931	1932	
Breaking strength of fibers, 1,000 pounds per square inch	Adequate	79	85	81	70	68	77
	Deficient	85	84	83	80	75	81
Mean fiber weight per inch, 10^{-4}, milligrams	Adequate	60	56	63	68	59	61
	Deficient	58	59	67	71	59	63
Immature fibers, per cent	Adequate	19	20	42	66	34	41
	Deficient	20	21	51	69	49	48
Mean length of fibers, inches	Adequate	.71	.77	.68	.62	.70	.70
	Deficient	.71	.73	.64	.58	.69	.67
Fiber length at upper 25% point, inches	Adequate	1.00	1.00	.92	.85	.95	.94
	Deficient	.96	.97	.87	.80	.93	.91
Percentage lint in seed cotton, per cent	Adequate	35.7	38.9	37.1	38.7	35.3	37.1
	Deficient	38.2	39.3	39.2	40.7	38.7	39.2
Weight of seed cotton per boll, grams	Adequate	8.12	7.42	6.85	7.54	7.71	7.53
	Deficient	6.97	6.80	5.00	6.15	5.90	6.16
Seed per boll, number	Adequate	30.5	32.2	29.0	30.8	32.5	31.0
	Deficient	31.2	30.0	24.4	29.7	28.8	28.8
Weight per seed, milligrams	Adequate	171	141	148	150	154	153
	Deficient	138	137	125	123	126	130
Weight of lint per seed, milligrams	Adequate	95	90	88	95	84	90
	Deficient	85	89	80	84	79	83

[1] The soil was kept dry after the first blossoms appeared on the deficient condition.

treatments used are presented in Tables 2 to 6, inclusive. Fertilizer applications were made the same way as described in Experiment No. 1. The manure, which was practically all horse manure with very little bedding or straw, was added broadcast in February and dug into the soil. All stalks were pulled and removed from the plots each year.

Blooms were tagged and measurements were made the same way as described in Experiment No. 1. Data obtained from this experiment are averaged by years in Tables 2 to 6, and by weeks in Appendix Tables 2 to 11.

Weight per boll. The weight per boll was reduced by omitting either nitrogen, phosphorus or potash, or by a shortage in moisture, as shown in Table 2. The greatest reduction was produced by a shortage in moisture. Under a condition of adequate moisture, omission of nitrogen produced a greater reduction in weight per boll than did omission of either phosphorus or potash. Under a condition of drought, a slight reduction in weight per boll was

produced by omitting nitrogen, but no reduction was produced by omitting phosphorus or potash. Thus, soil moisture and nitrogen appear to be the dominant factors in determining the weight per boll of cotton. Organic matter or some other constituent in manure tended to increase the weight per boll slightly over that

TABLE 2. AVERAGE WEIGHT PER BOLL OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE WITH DIFFERENT FERTILIZER TREATMENTS, MAIN STATION, 1933-38 AND 1940

Fertilizer treatment (pounds per acre)	Moisture condition of soil	Weight per boll							
		1933	1934	1935	1936	1937	1938	1940	Av.
		Gm.	*Gm.*	*Gm.*	*Gm.*	*Gm.*	*Gm.*	*Gm.*	*Gm.*
25,000 Manure	Adequate	8.31	8.07	8.28	7.98	7.66	6.74	6.66	7.67
500 Superphosphate	Deficient	6.56	6.52	7.40	--	6.56	6.50	5.20	6.46
1,000 Superphosphate	Adequate	8.58	7.75	7.67	7.60	7.55	6.83	6.23	7.46
750 Nitrate of soda	Deficient	6.51	6.73	7.08	--	6.15	5.47	5.30	6.21
250 Muriate									
1,000 Superphosphate	Adequate	7.54	6.51	7.23	6.79	6.34	5.56	5.67	6.52
250 Muriate	Deficient	6.99	6.36	6.71	--	5.62	5.02	5.23	5.99
750 Nitrate of soda	Adequate	8.28	7.37	7.61	7.26	6.78	6.03	5.33	6.95
250 Muriate	Deficient	6.45	6.72	7.24	--	6.24	5.95	4.57	6.20
1,000 Superphosphate	Adequate	8.69	7.44	7.46	6.67	6.79	6.96	6.40	7.20
750 Nitrate of soda	Deficient	6.97	6.58	6.92	--	6.33	5.79	5.32	6.32
None	Adequate	7.90	6.76	7.46	6.40	6.25	6.29	5.57	6.66
	Deficient	6.95	5.98	6.83	--	5.52	5.52	4.62	5.90

TABLE 3. AVERAGE NUMBER OF SEED PER BOLL OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE WITH VARYING FERTILIZER TREATMENTS, MAIN STATION, 1933-38 AND 1940

Fertilizer treatment (pounds per acre)	Moisture condition of soil	Number of seed per boll							
		1933	1934	1935	1936	1937	1938	1940	Av.
25,000 Manure	Adequate	34.3	34.3	36.6	34.6	32.4	29.4	31.2	33.3
500 Superphosphate	Deficient	32.2	34.1	35.5	--	34.4	31.8	28.7	32.8
1,000 Superphosphate	Adequate	35.5	33.7	36.3	34.1	33.2	29.9	28.7	33.1
750 Nitrate of soda	Deficient	33.9	33.5	36.2	--	34.3	29.6	30.6	33.0
250 Muriate									
1,000 Superphosphate	Adequate	32.2	30.1	33.2	31.7	28.8	25.0	28.0	29.9
250 Muriate	Deficient	32.8	30.5	32.4	--	27.9	24.6	28.4	29.4
750 Nitrate of soda	Adequate	34.2	32.1	33.2	32.6	30.2	26.1	25.5	30.6
250 Muriate	Deficient	31.9	32.8	34.7	--	32.3	30.2	25.7	31.3
1,000 Superphosphate	Adequate	35.2	33.4	35.3	33.7	32.7	29.6	31.1	33.0
750 Nitrate of soda	Deficient	33.7	33.6	36.2	--	34.1	31.0	29.2	33.0
None	Adequate	33.1	31.5	34.6	30.4	28.8	26.9	27.0	30.3
	Deficient	31.0	28.7	32.5	--	29.7	26.8	24.2	28.8

TABLE 4. AVERAGE WEIGHT PER SEED OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF MOISTURE AND WITH VARYING FERTILIZER TREATMENTS, MAIN STATION, 1933-38 AND 1940

Fertilizer treatment (pounds per acre)	Moisture condition of soil	Weight per seed							
		1933	1934	1935	1936	1937	1938	1940	Av.
		Mg.	*Mg.*	*Mg.*	*Mg.*	*Mg.*	*Mg.*	*Mg.*	*Mg.*
25,000 Manure	Adequate	152	156	149	151	153	159	140	151
500 Superphosphate	Deficient	128	122	134	..	118	136	116	126
1,000 Superphosphate	Adequate	155	152	140	145	144	152	137	146
750 Nitrate of soda	Deficient	125	127	127	..	109	124	113	121
250 Muriate									
1,000 Superphosphate	Adequate	143	137	134	134	134	138	124	135
250 Muriate	Deficient	135	130	129	..	121	127	113	126
750 Nitrate of soda	Adequate	154	149	148	143	138	146	130	144
250 Muriate	Deficient	130	129	132	..	116	127	115	125
1,000 Superphosphate	Adequate	158	147	137	128	129	149	136	141
750 Nitrate of soda	Deficient	134	125	126	..	115	123	123	124
None	Adequate	148	135	136	131	130	147	125	136
	Deficient	139	129	131	..	110	127	119	126

TABLE 5. AVERAGE WEIGHT OF LINT PER SEED OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF MOISTURE AND WITH VARYING FERTILIZER TREATMENTS, MAIN STATION, 1933-38 AND 1940

Fertilizer treatment (pounds per acre)	Moisture condition of soil	Weight of lint per seed							
		1933	1934	1935	1936	1937	1938	1940	Av.
		Mg.	*Mg.*	*Mg.*	*Mg.*	*Mg.*	*Mg.*	*Mg.*	*Mg.*
25,000 Manure	Adequate	91	79	78	80	83	78	70	80
500 Superphosphate	Deficient	70	69	75	..	73	68	66	70
1,000 Superphosphate	Adequate	87	78	71	78	83	77	72	78
750 Nitrate of soda	Deficient	67	74	69	..	70	61	64	68
250 Muriate									
1,000 Superphosphate	Adequate	91	79	83	80	87	85	74	83
250 Muriate	Deficient	78	78	78	..	80	77	70	77
750 Nitrate of soda	Adequate	88	80	81	80	87	85	78	83
250 Muriate	Deficient	72	75	77	..	77	70	65	73
1,000 Superphosphate	Adequate	89	76	75	70	79	86	65	77
750 Nitrate of soda	Deficient	73	71	65	..	71	64	65	68
None	Adequate	91	80	80	79	87	87	81	84
	Deficient	85	79	79	..	75	79	74	79

TABLE 6. PERCENTAGE OF LINT IN COTTON GROWN UNDER DIFFERENT CONDITIONS OF MOISTURE AND WITH VARYING FERTILIZER TREATMENTS, MAIN STATION, 1933-38 AND 1940

Fertilizer treatment (pounds per acre)	Moisture condition of soil	Percentage of lint							
		1933	1934	1935	1936	1937	1938	1940	Av. of all years
25,000 Manure	Adequate	37.4	33.6	34.3	34.6	35.3	34.3	32.9	34.6
500 Superphosphate	Deficient	35.4	36.1	35.9	--	38.1	33.3	36.2	35.8
1,000 Superphosphate	Adequate	35.8	33.9	33.8	35.1	36.5	33.8	33.0	34.6
750 Nitrate of soda	Deficient	34.7	36.7	35.2	--	39.1	33.0	37.0	36.0
250 Muriate									
1,000 Superphosphate	Adequate	38.8	36.6	38.3	37.1	39.4	38.3	36.6	37.9
250 Muriate	Deficient	36.6	37.4	37.9	--	39.9	37.5	38.3	38.0
750 Nitrate of soda	Adequate	36.5	35.0	35.5	35.8	38.6	36.9	37.2	36.5
250 Muriate	Deficient	36.7	36.7	36.7	--	39.8	35.5	36.6	37.0
1,000 Superphosphate	Adequate	35.9	34.2	35.3	35.2	37.9	36.6	31.6	35.2
750 Nitrate of soda	Deficient	35.3	36.2	34.1	--	38.3	34.3	35.1	35.6
None	Adequate	38.1	37.3	37.0	37.8	40.0	36.9	39.1	38.0
	Deficient	37.8	37.9	37.8	--	40.7	40.2	39.1	38.9

produced with mineral sources of nitrogen, phosphorus, and potash. The increase, however, is not large enough to be significant.

Number of seed per boll. Number of seed per boll was reduced by omitting nitrogen and/or phosphorus from the fertilizer, Table 3. The moisture condition of the soil had no significant effect on number of seed per boll. This is in contrast to the results from Experiment No. 1, in which the number of seed was increased slightly by adequate moisture.

Weight per seed. Results presented in Table 4 show that weight per seed is greatly affected by moisture condition of the soil and by fertilizer treatment. A droughty condition reduced the weight of seed in all fertilizer treatments used. When cotton was grown with sufficient moisture, omission of either nitrogen, phosphorus, or potash reduced the weight per seed. Greatest reduction occurred when nitrogen was omitted. Under conditions of drought, fertilizer had no effect on weight per seed.

Weight of lint per seed. Weight of lint per seed, Table 5, was not significantly affected by fertilizer treatment. However, it was significantly reduced by drought. Weight of lint per seed was reduced by a shortage in soil moisture in all cases. The greatest reduction occurred when nitrogen was included in the fertilizer.

Percentage of lint. Percentage of lint is increased by a shortage of soil moisture, as well as by omission of either nitrogen, phosphorus, or potash from the fertilizer. (See Table 6.) The greatest effect on percentage of lint attributable to fertilizer is the definite decrease produced by addition of nitrogen. Conditions that are favorable for a high yield, (ample moisture and use of a balanced fertilizer at a high acre rate), lower the percentage of lint. This is due to the fact that these conditions tend to produce greater gain in weight per seed than in weight of lint per seed.

Soil Type Studies

Results obtained in this study are given in Table 7. Cotton grown in Norfolk sandy loam soil had fewer seed per boll and

Table 7. Effect of Soil Type on Various Properties of Seed and Fiber of Cotton, Main Station, 1928-34

Character measured	Soil type[1]	Year							
		1928	1929	1930	1931	1932	1933	1934	Av.
Weight of seed cotton per boll, grams	NSL	7.21	7.34	5.72	6.96	5.85	7.27	6.18	6.65
	DCL	7.45	7.57	5.76	6.46	6.53	7.89	7.31	7.00
Seed per boll, number	NSL	33.4	35.2	26.8	31.2	29.0	33.1	32.3	31.6
	DCL	34.5	36.0	26.5	29.7	30.0	34.7	35.3	32.4
Weight per seed, milligrams	NSL	13.1	12.5	13.0	13.3	12.6	13.8	12.1	12.9
	DCL	13.2	12.6	13.1	12.7	13.5	14.6	13.5	13.3
Weight of lint per seed, milligrams	NSL	83	83	84	90	77	83	70	81
	DCL	84	84	86	90	83	82	73	83
Percentage of lint, per cent	NSL	38.4	39.9	39.3	40.5	38.1	37.6	36.7	38.6
	DCL	38.7	39.9	39.6	41.5	38.0	35.8	35.0	38.4
Breaking strength of fibers, 1,000 lb. per sq. in.	NSL	82	76	74	74	74	73	75	75
	DCL	75	68	66	65	67	65	69	68
Mean fiber weight per inch, 10^{-4}, milligrams	NSL	55	55	55	63	58	66	62	59
	DCL	53	56	59	66	61	63	61	60
Immature fibers, per cent	NSL	28	28	75	72	71	61	48	55
	DCL	24	27	80	70	43	60	44	50
Mean length of fibers, inches	NSL	.71	.73	.73	.62	.70	.60	.62	.67
	DCL	.77	.75	.70	.59	.67	.67	.69	.69
Fiber length at upper 25% point, inches	NSL	.97	1.00	.98	.87	.95	.85	.87	.93
	DCL	1.01	.99	.95	.83	.91	.93	.94	.94

[1] NSL: Norfolk sandy loam from near Auburn, Alabama. DCL: Deer Creek loam from near Stoneville, Mississippi.

slightly less weight of seed cotton per boll, weight per seed, and weight of lint per seed than did cotton grown in Deer Creek loam. Percentages of lint of cotton grown in the two soils were approximately the same. Type of soil had only a very slight effect on any of these characteristics under conditions of this experiment.

Variety and Soil Moisture Studies

In connection with soil moisture studies, four different varieties of cotton were grown to determine if there was a varietal variation in response to moisture. Plots similar to those previously described were used. All plots received the same fertilizer treatment, consisting of an application of 750 pounds of nitrate of soda, 1,000 pounds of superphosphate, and 250 pounds of muriate of potash per acre. The same method of application was used as in the other tests.

Results reported in Table 37 show that the varieties responded very similarly but not to the same degree. All varieties had smaller bolls and seed, and less lint per seed when grown under moisture-deficient conditions than when grown with adequate moisture. Varieties differed in the degree to which they responded. For instance, percentage of lint in Mexican Big Boll was increased by drought, while in the other three varieties it was decreased. This difference is due to the fact that drought produced a greater reduction in weight per seed than it did in weight of lint per seed in the Mexican Big Boll variety, whereas in the other varieties the effects were opposite.

Oil Content of Seed

Influence of Soil Moisture

The seed of cotton from the experiment to determine effects of fertilizer treatment and soil moisture on various properties of cotton, Experiment No. 2, were analyzed for oil. The results show that the percentage of oil was reduced by a shortage in soil moisture, Table 8. Reduction in oil due to drought occurred in all cases regardless of fertilizer treatment. The extent of reduction was much greater when cotton was fertilized with a complete fertilizer than it was when the fertilizer was not balanced with respect to nitrogen, phosphorus, and potash. This may be explained by the fact that the oil content of seed is

TABLE 8. PERCENTAGE OF OIL IN SEED OF COTTON RECEIVING DIFFERENT FERTILIZER AND MOISTURE TREATMENTS, MAIN STATION, 1933-38, AND 1940

Fertilizer treatment (pounds per acre)	Moisture condition of soil	Percentage of oil in seed							
		1933	1934	1935	1936	1937	1938	1940	Av.
25,000 Manure	Adequate	26.4	25.0	24.1	24.8	26.1	23.1	25.8	25.0
500 Superphosphate	Deficient	19.0	21.5	21.7	--	20.0	20.3	23.7	21.0
1,000 Superphosphate	Adequate	23.9	25.7	23.3	24.1	24.9	23.5	25.9	24.5
750 Nitrate of Soda	Deficient	19.5	21.3	20.9	--	20.4	18.6	23.9	20.8
250 Muriate									
1,000 Superphosphate	Adequate	26.1	25.9	24.3	26.8	24.8	23.0	27.9	25.5
250 Muriate	Deficient	22.9	22.4	24.3	--	25.6	22.4	25.8	23.9
750 Nitrate of soda	Adequate	23.1	21.2	21.6	23.7	23.0	20.6	23.8	22.4
250 Muriate	Deficient	18.7	20.8	21.2	--	20.9	19.0	23.3	20.7
1,000 Superphosphate	Adequate	23.4	21.4	20.1	20.6	21.4	20.0	24.0	21.6
750 Nitrate of Soda	Deficient	18.1	20.5	19.6	--	20.3	17.4	23.4	20.0
None	Adequate	24.8	23.2	23.4	23.6	22.9	20.7	25.6	23.5
	Deficient	21.6	22.0	22.6	--	20.8	21.2	25.1	22.2

reduced either by the absence of certain elements from the fertilizer or by a shortage in moisture. Either factor acting alone may reduce the oil content. However, both together cannot reduce it below a certain minimum. Thus, the gain in oil that might be obtained by proper fertilization would be to a large degree prevented by a drought. On the other hand, the increase in oil that might occur due to more favorable moisture conditions would not be obtained if the cotton were not properly fertilized. The maximum oil content is attained when cotton is grown under a condition of adequate moisture and at a high level of fertility.

If the data are examined by periods (Appendix Tables 12 and 13), it is evident that reduction of oil due to deficient moisture occurred during all periods with all treatments. This indicates that oil storage in seed occurred late in the period of seed development. The seed from early blooms did not experience as great a moisture deficiency in their early period of growth as those occurring later. Due to the experimental procedure followed, soil moisture became less and less as the season advanced; thus seed from the early blooms experienced a water shortage only in their latter stages of growth, while those from blooms occurring late experienced the shortage during their entire period of growth. Seed produced under both conditions had approximately the same oil content and indicates that oil storage occurred late in the development of the seed.

Influence of Soil Type

Seed of cotton grown in the soil-type-studies experiment were analyzed for oil and the results are presented in Table 9. These results show that the seed from cotton grown in Deer Creek loam soil had a significantly higher content of oil than did those produced in Norfolk sandy loam soil. Therefore, it is evident that the type of soil may significantly influence oil content of seed. This is probably due to the high plant food content of the Deer Creek loam soil.

TABLE 9. PERCENTAGE OF OIL IN SEED OF COTTON GROWN ON DIFFERENT SOIL TYPES, MAIN STATION, 1930-34

Year	Percentage of oil in seed	
	Norfolk sandy loam	Deer Creek loam
1930	23.4	27.8
1931	23.4	26.2
1932	23.4	25.0
1933	20.9	21.8
1934	18.8	21.2
Average	22.0	24.4

Influence of Fertilizers

Oil content of seed grown in the Experiment No. 2, where fertilizer and moisture treatments were varied, are given in Table 8 and Appendix Tables 12 and 13. From these data it is apparent that the fertilizer had a marked effect on oil content of seed when cotton was grown with adequate moisture. Cotton fertilized with a complete fertilizer or with only phosphate and potash produced seed that were higher in oil than plots that had no fertilizer or that received nitrogen and phosphorus or nitrogen and potash. Thus, the absence of either phosphorus or potash from the fertilizer reduced the oil content of seed.

The source of nitrogen used in this experiment was nitrate of soda. Data from the plot receiving nitrogen and phosphorus indicate that so far as oil content is concerned the sodium in nitrate of soda did not substitute for potash.

Manure as a source of nitrogen and potash did not produce a significant increase in oil over that produced by commercial fertilizers. This indicates that manure has no special advantage over commercial fertilizer in production of oil.

When cotton was grown under drought conditions, the oil content was not significantly affected by fertilizer, except when nitrogen was applied the oil content was decreased. This is perhaps due to the fact that the stress for moisture was much greater when nitrogen was applied, since the plants were much larger and used more water.

Effect of Potash

In order to study the effect of potash on oil content of seed, samples were collected in 1938 from cotton grown in a rate-of-potash test at three Substations in the State. Cotton in these tests was grown continuously, using annual treatments shown in Table 10 since the beginning of the test in 1930. The crop in 1938 was the ninth. The results, given in Table 10, show that application of potash increased the oil content of seed. The

TABLE 10. PERCENTAGE OF OIL IN SEED FROM COTTON GROWN AT THREE LOCATIONS AND RECEIVING DIFFERENT RATES OF POTASH, 1938

Fertilizer (600 lb. per acre of formula)	Percentage of oil in seed			
	Headland[1]	Crossville[2]	Belle Mina[3]	Average
6-10-0	18.9	20.9	20.2	20.0
6-10-2	22.2	23.5	22.5	22.7
6-10-4	23.6	22.8	22.9	23.1
6-10-8	25.6	23.8	22.2	23.9
6-10-16	25.5	23.5	25.1	24.7

[1] Wiregrass Substation.
[2] Sand Mountain Substation.
[3] Tennessee Valley Substation.

TABLE 11. YIELDS OF SEED COTTON, WEIGHT OF 100 BOLLS, PERCENTAGE OF LINT, PERCENTAGE OF OIL CONTENT OF SEED FROM COTTON GROWN ON NORFOLK SANDY LOAM SOIL AND SIDE-DRESSED WITH POTASH, 5-YEAR AVERAGES, 1928-32

Potash fertilizer[1] (pounds of muriate, 50% per acre)		5-year averages, 1928-1932[2]			
Before planting	Side-dressing	Seed cotton per acre	Weight of 100 bolls[3]	Percentage of lint	Oil in seed
		Pounds	*Pounds*	*Per cent*	*Per cent*
None	0	506	1.06	38.3	22.8
50	0	782	1.16	38.5	24.3
50	200	794	1.18	38.2	25.5

[1] All plots received 400 pounds of superphosphate (16%) and 200 pounds of nitrate of soda per acre.
[2] Eleven experiments over a 5-year period, in each of which the potash treatments were replicated 5 times in a randomized arrangement.
[3] A sample of 100 bolls was taken at each picking to determine the weight of bolls, and percentages of lint and oil content of seed.

increase was very marked for the first increment of potash, but was much less for succeeding increments.

In another series of tests conducted in 1928 to 1932 with cooperating farmers in the vicinity of Auburn, the effects of potash on yield and oil content of cotton seed were studied. The experiments were all located on Norfolk sandy loam soils. The fertilizer consisted of 400 pounds of superphosphate (16%) and 200 pounds of nitrate of soda to all treatments. Potash treatments were: (1) none, (2) 50 pounds, and (3) 250 pounds of muriate (50%) per acre. The 250-pound application was made as 50 pounds before planting and 200 pounds as a side-dressing at the first cultivation. In each experiment five randomized replications were used. During the 5 years, 11 experiments were completed. Results in Table 11 show that oil content of seed was increased by potash applications. The largest increase was obtained with the first increment of potash.

Influence of Calcium and Magnesium

Samples of seed were collected from cotton grown at four locations on plots used in a source and rate-of-liming study. The cotton was grown in a 2-year rotation of cotton, vetch, and corn. The 1938 crop was the ninth grown. Cotton received 600 pounds of 6-10-4 fertilizer made from ammonium sulfate (20.5%), superphosphate (16%), and muriate of potash (60%). Vetch received 600 pounds of 0-10-4 and the corn was not fertilized. The lime was applied only to the cotton. In the 9 years' rotation, the plots had received five applications of lime. The data in Table 12 show that at the rates used lime either in form of calcium or magnesium did not affect the oil content of seed in any of these tests.

TABLE 12. INFLUENCE OF CALCIUM AND MAGNESIUM ON OIL CONTENT OF SEED FROM COTTON GROWN AT FOUR LOCATIONS, 1938[1]

Lime to cotton		Amount of oil in seed				
Source	Rate per acre	Headland	Prattville[2]	Crossville	Belle Mina	Av.
	Pounds	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
0	0	23.3	24.9	22.0	22.1	23.1
Calcium carbonate	200	23.4	21.9	22.0	22.7	22.5
Dolomite	200	23.4	23.8	21.8	21.5	22.6
Dolomite	400	24.0	23.9	22.2	22.0	23.0

[1] Cotton received 600 pounds of 6-10-4 fertilizer made from superphosphate (16%), muriate of potash (60%) and ammonium sulfate (20.5%).
[2] Prattville Experiment Field.

Under conditions of this test, no marked deficiencies could be observed in cotton. It is probable that the areas used were not sufficiently low in either calcium or magnesium for these elements to be limiting factors. Therefore, it is not to be assumed that these elements might not influence the oil content of seed on areas in which a deficiency of these elements occurs.

Influence of Ratio of Nitrogen, Phosphoric Acid, and Potash

An experiment involving different ratios of nitrogen, phosphoric acid, and potash in fertilizers for cotton was conducted at Auburn in 1938 and 1939. The soil used was a Norfolk sandy loam of good fertility. It had been planted to cotton that received liberal applications of a complete fertilizer for several years previous. The treatments were randomized, using three replications in each case. Composite samples of seed from each plot were used for analysis. The data are presented in Table 13. There was no very marked effect on oil content of seed. However, there was a small reduction in oil as nitrogen was increased, and a small increase in oil as the potash was increased.

Effect of Variety, Season, Location, and Pickings

Seed samples from the first and second picking of cotton grown in variety tests at nine places in Alabama were collected and analyzed for oil in 1938 and 1939. The data are reported in Tables 14 and 15.

Effect of variety. The average oil content of the first and second picking, Table 14, show that while varieties vary with respect to oil, the variation is not always consistent. In general, a variety high in oil is high at all locations and one low in oil is low at all locations. Varieties in the high-oil group shift their relative positions with respect to each other, and, thus, the average for all places shows there is no significant difference in oil content of varieties belonging in this group. Correspondingly, varieties in the low-oil group behave in the same manner. Varieties having relatively high-oil content were Cook 144, Cook 307, and Cook 1255; those having low-oil content were Qualla, Mebane, Misdel 1, Farm Relief, and Cook 1347.

The data indicate that oil content of seed has not received sufficient consideration in selection and improvement of varieties. For example, Qualla was very low in oil, while Qualla No. 2 was

relatively high. Cook 144 and Cook 307 are high, while Cook 1347 is low; Misdel is high and Misdel 1 is low. It appears that oil content of seed might be increased as cotton varieties are improved, provided this character is considered in the selections made.

Effect of season. Data in Tables 14 and 15 show that season has a very marked effect on oil content of seed. The 1938 crop in all cases averaged lower in oil than the 1939 crop. These varia-

TABLE 13. EFFECTS OF DIFFERENT RATIOS OF NITROGEN, PHOSPHORUS, AND POTASH ON OIL CONTENT OF COTTON SEED OF TWO VARIETIES, MAIN STATION, 1933-39

Fertilizer (600 pounds per acre of analysis shown)	Percentage of oil in seed[1]						Average
	Cook			Half and Half			
	1938	1939	Av.	1938	1939	Av.	
0-0-0	20.5	18.3	19.4	17.7	19.0	18.4	18.9
0-0-4	22.9	22.5	22.7	21.2	20.9	21.1	21.9
0-0-8	22.6	21.5	22.1	21.9	21.4	21.7	21.9
0-8-0	20.0	19.3	19.7	17.5	13.1	15.3	17.5
0-8-4	21.6	20.3	21.0	21.7	20.5	21.1	21.1
0-8-8	22.1	21.9	22.0	21.6	20.4	21.0	21.5
0-16-0	20.1	18.9	19.5	20.8	20.2	20.5	20.0
0-16-4	21.4	21.6	21.5	21.7	19.6	20.7	21.1
0-16-8	22.3	21.3	21.8	22.9	21.4	22.2	22.0
6-0-0	19.0	18.8	18.9	19.5	15.2	17.4	18.2
6-0-4	20.0	21.2	20.6	19.7	18.7	19.2	19.9
6-0-8	21.6	22.5	22.1	22.0	19.0	20.5	21.3
6-8-0	20.0	18.2	19.1	19.8	19.4	19.6	19.4
6-8-4	21.1	19.9	20.5	18.8	20.7	19.8	20.2
6-8-8	21.2	19.3	20.3	20.3	21.4	20.9	20.6
6-16-0	19.4	19.2	19.3	20.8	14.3	17.6	18.5
6-16-4	19.8	19.9	19.9	21.7	18.9	20.3	20.1
6-16-8	21.9	21.2	21.6	21.8	21.3	21.6	21.6
12-0-0	20.4	18.4	19.4	19.4	18.5	19.0	19.2
12-0-4	19.0	19.4	19.2	17.9	19.1	18.5	18.9
12-0-8	19.2	19.1	19.2	19.3	20.7	20.0	19.6
12-8-0	20.4	20.4	20.4	18.7	17.3	18.0	19.2
12-8-4	19.5	20.0	19.8	19.9	20.7	20.3	20.1
12-8-8	19.6	20.9	20.3	19.7	20.6	20.2	20.3
12-16-0	20.3	19.2	19.8	21.9	16.3	19.1	19.5
12-16-4	19.2	19.0	19.1	21.2	20.0	20.6	19.9
12-16-8	19.7	20.3	20.0	19.9	19.3	19.6	19.8
Average all 0 nitrogen plots	21.5	20.6	21.1	20.8	19.6	20.2	20.7
" " 6% " "	20.4	20.0	20.2	20.5	18.8	19.7	20.0
" " 12% " "	19.7	19.6	19.7	19.8	19.2	19.5	19.6
" " 0 P_2O_5 "	20.6	20.2	20.4	19.8	19.2	19.5	20.0
" " 8% " "	20.6	20.0	20.3	19.8	19.3	19.6	20.0
" " 16% " "	20.5	20.1	20.3	21.4	19.0	20.2	20.3
" " 0 K_2O "	20.0	19.0	19.5	19.6	17.0	18.3	18.9
" " 4 " "	20.5	20.4	20.5	20.4	19.9	20.2	20.4
" " 8 " "	21.1	20.9	21.0	21.0	20.6	20.8	20.9

[1] Percentage given is average for determinations made from three replications.

TABLE 14. OIL CONTENT OF SEED OF DIFFERENT VARIETEIS OF COTTON GROWN AT NINE LOCATIONS, 1938-39

Variety	Percentage of oil in seed											
	North Alabama				Central Alabama						South Ala.	Av. all locations
	Belle Mina	Alexandria[1]	Crossville	Av.	Aliceville[2]	Marion Junction[3]	Prattville	Auburn[4]	Lafayette[5]	Av.	Monroeville[6]	
						1938						
Cook 144-35	19.6	19.7	23.8	21.0	21.8	21.2	23.8	22.2	22.9	22.4	21.9	21.9
Cook 307	19.6	21.1	23.2	21.3	20.1	20.5	24.1	21.8	23.4	22.0	21.4	21.7
Cook 1255	18.3	22.2	22.8	21.1	20.8	17.8	25.0	21.9	24.1	21.9	21.4	21.6
Clevewilt	19.0	21.1	23.2	21.1	21.0	21.4	22.1	21.7	21.3	21.5	20.9	21.3
D.P.L. 11 A	19.5	19.9	21.3	20.2	23.2	19.2	24.2	20.3	25.0	22.4	20.3	21.4
Farm Relief	19.5	20.3	22.0	20.6	18.8	20.7	23.2	21.4	21.0	21.0	20.7	20.8
Half and Half	20.2	20.4	22.7	21.1	20.7	19.9	23.4	22.5	22.5	21.8	20.8	21.5
Misdel 1	18.4	19.5	20.6	19.5	21.8	19.7	22.4	21.9	20.1	21.2	21.3	20.6
Qualla	16.7	16.8	20.6	18.0	17.8	15.9	20.2	18.2	16.7	17.8	15.9	17.6
Stoneville 2 B	18.9	19.8	23.1	20.6	20.1	20.8	24.2	20.9	23.3	21.9	19.9	21.2
Average	19.0	20.1	22.3	20.5	20.6	19.7	23.3	21.3	22.0	21.4	20.5	21.0
						1939						
Cook 144-36	24.6	23.9	21.9	23.5	20.5	25.9	27.2	24.6	28.3	25.3	23.8	24.5
Cook 307	26.5	23.4	23.1	24.3	22.7	26.5	25.6	25.0	27.8	25.5	25.4	25.1
Cook 1347	24.6	24.5	22.7	23.9	19.6	27.3	23.4	24.4	25.2	24.0	20.7	23.6
Clevewilt	23.6	21.1	20.6	21.8	20.5	26.2	24.4	21.6	27.7	24.1	23.1	23.2
D.P.L. 11 A	24.5	23.9	25.7	24.7	20.9	24.0	24.6	24.5	25.0	23.8	22.6	24.0
Hi-Bred	24.4	23.1	20.9	22.8	21.3	26.2	23.4	19.9	27.1	23.6	19.2	22.8
Mebane	22.3	--	22.2	22.3	20.2	25.0	21.7	21.8	22.2	22.2	19.5	21.9
Misdel	25.2	--	23.6	24.4	23.3	24.9	24.4	23.5	28.3	24.9	21.5	24.3
Qualla No. 2	24.8	--	26.3	25.6	21.5	23.6	23.0	24.5	28.3	24.2	23.5	24.4
Stoneville 2 B	21.0	24.6	25.3	23.6	22.2	25.7	24.5	24.9	24.0	24.3	20.7	23.7
Average	24.2	23.5	23.2	23.7	21.3	25.5	24.2	23.5	26.4	24.2	23.5	23.8

[1] Alexandria Experiment Field.
[2] Aliceville Experiment Field.
[3] Black Belt Substation.
[4] Main Station.
[5] Lafayette Experiment Field.
[6] Monroeville Experiment Field.

TABLE 15. OIL CONTENT OF SEED OF THE FIRST AND SECOND PICKING OF 10 VARIETIES OF COTTON AT 11 LOCATIONS, 1938-39

Picking	Percentage of oil in seed														
	North Alabama				Central Alabama						South Alabama				Av. all locations
	Belle Mina	Alex-andria	Cross-ville	Av.	Alice-ville	Marion Junction	Pratt-ville	Auburn	Lafay-ette	Av.	Monroe-ville	Brew-ton[1]	Head-land	Av.	
								1938							
First	18.7	19.7	21.7	20.0	--	19.1	23.9	22.6	22.7	22.1	20.7	21.7	21.0	21.1	21.2
Second	19.2	20.5	22.9	20.9	--	20.3	22.6	20.0	21.3	21.0	20.2	20.5	19.2	20.0	20.7
Av.	19.0	20.1	22.3	20.5	--	19.7	23.3	21.3	22.0	21.6	20.5	21.1	20.1	20.6	20.9
								1939							
First	25.2	23.9	23.4	24.2	21.3	25.5	24.3	23.3	--	23.6	22.3	22.1	23.3	22.6	23.5
Second	23.1	23.0	23.0	23.0	21.2	25.6	24.2	23.6	--	23.7	19.9	20.8	23.6	21.4	22.8
Av.	24.2	23.5	23.2	23.6	21.3	25.5	24.2	23.5	--	23.6	21.1	21.5	23.5	22.0	23.2

[1] Brewton Experiment Field.

tions from season to season can probably be explained by rainfall. Rainfall in 1939 was abnormally high in August, about 9 inches above normal, throughout the State. The 1938 rainfall in August was a little below normal, about .81 inches.

Effect of location. Some locations produced cotton with a much higher oil content than others, Tables 14 and 15. The location difference is not consistent. For example, cotton at Marion Junction and Belle Mina had the lowest oil content of any of the locations in 1938, while in 1939 the cotton at these locations was the highest. If the data are averaged for 2 years, there is not a great difference in oil content at any of the places. This indicates that season is an important factor in oil content of seed, and one cannot always be certain that any given locality will always produce seed with a high oil content.

The most probable explanation of the course of variation from locality to locality is rainfall. High oil content is associated with high moisture content of the soil during the period of formation of oil in the seed.

Effect of pickings. Results reported in Table 15 are average percentages of oil content of seed by pickings from 10 varieties grown at 11 locations in 1938 and 1939. The data indicate that oil content of seed in the first picking is slightly higher than in the second picking. This is perhaps due to a shortage in moisture as the cotton advanced in age.

Effect of Variety and Soil Moisture

In connection with a study of the influence of fertilizers under controlled conditions of moisture at the Main Station, Experi-

TABLE 16. PERCENTAGE OF OIL IN SEED OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE, MAIN STATION, 1936-38

Variety	Moisture condition of soil	Percentage of oil in seed			
		1936	1937	1938	Average
Mexican Big Boll	Adequate	24.8	24.9	23.5	24.4
	Deficient	—	20.4	18.6	19.5
Cook 1006	Adequate	24.3	22.4	22.4	23.0
	Deficient	—	20.6	19.2	19.9
Clevewilt Strain 5	Adequate	23.6	24.1	20.9	22.9
	Deficient	—	19.1	16.9	18.0
Stoneville 5 A	Adequate	23.2	22.6	21.6	22.5
	Deficient	—	19.6	18.7	19.2

ment No. 2, four different varieties were studied to determine if varieties might respond differently to soil moisture conditions. All varieties received the same fertilizer treatments. Data obtained in this test are reported in Table 16. It may be noted that varieties differ in oil content of seed, but that moisture deficiency decreased the oil content of all varieties. This indicates that varieties of cotton respond very similarly to soil moisture. The oil content of all varieties approached the same level under drought conditions. These data further confirm the fact that soil moisture is a dominant factor in determining oil content of seed.

Effect of Disease

Seed samples were collected from diseased and healthy stalks in connection with a study of effect of fertilizers on wilt occurrence in cotton in 1938 and 1939. Samples were taken from each replicate of 27 different fertilizer treatments, which were replicated three times. Two varieties were used in the test. Results of determinations made on the oil content of seed are reported in Table 17, and show that the oil content of seed was much lower from diseased stalks than from healthy plants.

TABLE 17. OIL CONTENT OF SEED OF COTTON FROM DISEASED AND HEALTHY STALKS, MAIN STATION, 1938-39

Variety	Percentage of oil content	
	Healthy plants	Diseased plants
Cook	19.6	17.0
Half and Half	20.3	18.9

Effect of Method of Preparation of Soil

An experiment was conducted at the Prattville Experiment Field on Red Bay soil and on Decatur clay soil at the Tennessee Valley Substation near Belle Mina, in which different methods of soil preparation were used. This experiment was conducted in cooperation with the USDA Tillage Machinery Laboratory of the Division of Agricultural Engineering. All plots received 600 pounds of 6-8-4 fertilizer and were cultivated alike. One sample of cotton was collected at each picking from each plot for analysis of oil content of seed. The results are reported in Table 18. It may be noted that there was a considerable variation in

TABLE 18. EFFECTS OF METHODS OF LAND PREPARATION ON PERCENTAGE OF OIL IN SEED FROM COTTON GROWN AT TWO LOCATIONS, 1939

Plot	Plot treatment of land preparation studies	Prattville			Belle Mina			Average
		Picking			Picking			
		First	Second	Av.	First	Second	Av.	
		pct.	*pct.*	*pct.*	*pct.*	*pct.*	*pct.*	*pct.*
(Ck.) 1	Burst out old row in fall; bed on fertilizer Mar. 20-25	25.0	22.8	23.9	23.8	22.0	22.9	23.4
2	Burst out old row in fall; bed on fertilizer with 2 furrows February 1	25.7	22.2	24.0	23.4	22.4	22.9	23.5
3	Burst out old row in fall; bed back by bursting old middle Feb. 1; apply fertilizer at side at planting	25.7	25.3	25.5	22.2	23.5	22.9	24.2
4	Burst out old row in fall; bed back by bursting old middle Feb. 1; open bed and put down fertilizer at planting	26.1	26.5	26.3	22.2	23.1	22.7	24.5
(Ck.) 5	Same as Plot 1	27.1	24.0	25.6	21.2	22.4	21.8	23.7
6	Burst out old rows in fall; bed on fertilizer by bursting old middles March 20-25	25.2	26.4	25.9	20.7	23.4	22.1	24.0
7	Burst out old row Mar. 1 to 15. Bed on fertilizer with 2 furrows March 20-25	26.6	24.9	25.8	23.6	22.4	23.0	24.4
8	Double disk Mar. 20; bed lightly on fertilizer Mar. 20-25	25.4	24.3	24.9	23.8	23.9	23.9	24.4

TABLE 18. EFFECTS OF METHODS OF LAND PREPARATION ON PERCENTAGE OF OIL IN SEED FROM COTTON GROWN AT TWO LOCATIONS, 1939 *(continued)*

Plot	Plot treatment of land preparation studies	Prattville			Belle Mina			Average
		Picking			Picking			
		First	Second	Av.	First	Second	Av.	
		pct.	*pct.*	*pct.*	*pct.*	*pct.*	*pct.*	*pct.*
(Ck.) 9	Same as Plot 1	26.2	25.1	25.7	23.5	22.0	22.8	24.3
10	Plow out old row with bull-tongue Mar. 1-15; bed on fertilizer with 4 furrows Mar. 20-25. Break out balk	21.7	23.0	22.4	22.3	21.0	21.7	22.1
11	Plow broadcast in fall; double disk Mar. 10; bed lightly on fertilizer Mar. 20-25	25.2	26.4	25.8	22.4	22.1	22.3	24.1
12	Plow broadcast in fall; bed lightly on fertilizer Mar. 20-25	26.5	24.6	25.6	22.4	20.8	21.6	23.6
(Ck.) 13	Same as Plot 1	25.7	23.7	24.7	22.1	21.7	21.9	23.3
14	Plow broadcast Mar. 15; bed lightly on fertilizer Mar. 20-25	28.3	26.7	27.5	20.7	19.6	20.2	23.9
15	Plow broadcast Mar. 15; double disk Mar. 20; bed lightly on fertilizer Mar. 20-25	26.6	25.3	26.0	21.6	20.8	21.2	23.6
16	Plow broadcast Mar. 15; double disk Mar. 15; double disk Mar. 20; double disk and bed on fertilizer Mar. 25	23.8	27.9	25.9	22.3	21.1	21.7	23.8
(Ck.) 17	Same as Plot 1	24.3	23.0	23.7	22.1	20.6	21.4	22.6

the oil content of seed from the check plots. Since only a small number of samples were used no very definite conclusion can be made. It appears that method of land preparation for cotton had little or no effect on oil content of seed, except, when almost no preparation was given (Plot 10), the oil content was somewhat lower.

Protein Content of Seed

Effect of Soil Moisture

The data reported were obtained from cotton grown in Experiment No. 2 described under "Seed Cotton Studies," page 7. The percentage of protein in seed was increased under conditions of limited soil moisture, Table 19. This was true regardless of fertilizer treatment.

If the data are examined by weekly periods (Appendix Table 14), it is evident that percentage of protein varied very little from week to week for any given treatment. Protein content of seed from bolls developed at different periods is remarkably uniform. This indicates either that there is not a short critical period during which the protein content of seed is determined, or that protein content is determined by some factor other than those under consideration, since bolls of different ages went through different moisture stresses during short periods.

Table 19. Percentage of Protein in Seed of Cotton Receiving Different Fertilizer and Moisture Treatments, Main Station, 1936-38 and 1940

Fertilizer (pounds per acre)	Moisture condition of soil	Percentage protein in seed				
		1936	1937	1938	1940	Average
25,000 Manure	Adequate	30.9	30.4	30.3	30.5	30.5
500 Superphosphate	Deficient	--	33.4	32.1	33.0	32.8
1,000 Superphosphate	Adequate	30.3	29.3	32.0	31.8	30.9
750 Nitrate of Soda	Deficient	--	33.2	31.6	33.0	32.6
250 Muriate						
1,000 Superphosphate	Adequate	27.3	27.4	26.9	28.7	27.5
250 Muriate	Deficient	--	28.8	28.0	28.0	28.3
750 Nitrate of soda	Adequate	31.8	32.1	31.1	32.2	31.8
250 Muriate	Deficient	--	33.5	32.3	32.5	32.8
1,000 Superphosphate	Adequate	30.7	32.6	30.4	31.8	31.3
750 Nitrate of Soda	Deficient	--	33.2	31.2	33.5	32.6
None	Adequate	28.7	27.6	27.4	29.4	28.3
	Deficient	--	29.4	29.9	30.4	29.9

Effect of Fertilizers

Analyses of seed in the experiment "Effect of Fertilizer Treatment and Soil Moisture on Various Properties of Cotton, Experiment No. 2," page 7, showed that the kind of fertilizer had a marked effect on protein content of seed under both conditions of moisture. A fertilizer very high in nitrogen produced cotton seed of a much higher protein content than seed of cotton receiving only phosphate and potash, Table 19. Also, reduction in protein content as a result of omitting nitrogen was greater than the reduction caused by supplying ample moisture. The highest protein content was obtained where cotton was grown under drought conditions with large amounts of nitrogen in the fertilizer.

Protein content of seed was about the same when either nitrate of soda or manure was the source of nitrogen. This indicates that manure contains no special constituents that affect protein content of cotton seed.

The protein content of seed was lower when phosphorus and potash were applied without nitrogen than when no fertilizer was used.

Effect of Potash

Seed from samples collected in 1938 for an oil study were analyzed for protein. The samples were collected from cotton grown in a rate-of-potash test at three Substations in the State. The potash treatments and data are reported in Table 20. These data show that the protein content was reduced slightly by the application of potash.

The probable explanation of this reduction is that the yield of cotton is increased by application of potash. Since nitrogen

TABLE 20. PERCENTAGE OF PROTEIN IN SEED OF COTTON GROWN AT THREE LOCATIONS, AND RECEIVING DIFFERENT RATES OF POTASH, 1938

Fertilizer (600 pounds per acre)	Protein in cotton seed			
	Headland	Crossville	Belle Mina	Average
	Per cent	*Per cent*	*Per cent*	*Per cent*
6-10-0	27.4	26.4	29.3	27.7
6-10-2	26.7	23.8	29.2	26.6
6-10-4	25.0	22.2	29.1	25.4
6-10-8	25.5	24.5	28.7	26.2
6-10-16	25.6	24.7	26.4	25.6

was not present in unlimited amounts, the increased yield brought about a lower ratio of nitrogen to the yield of cotton. As previously pointed out, the highest protein content was produced when the yield was limited by drought and when nitrogen was applied in large amounts.

These results are in agreement with those obtained in the experiment "Effect of Fertilizers," and they indicate that high protein content of the seed results from consumption of nitrogen by the plants in excess of that needed for maximum yield.

Influence of Calcium and Magnesium

Samples of seed collected for use in the oil study were analyzed for protein. The data are given in Table 21. It is apparent that applications of calcium or dolomitic lime had little or no effect on protein content of cotton seed.

TABLE 21. PERCENTAGE OF PROTEIN IN COTTON GROWN AT FOUR LOCATIONS, AND COTTON RECEIVING CALCIUM OR MAGNESIUM IN ADDITION TO FERTILIZER, 1938[1]

Lime to cotton		Percentage of protein in seed				
Source	Rate per acre	Headland	Prattville	Crossville	Belle Mina	Average
	Pounds					
0	0	30.8	30.5	29.1	28.2	29.7
Calcium Carbonate	200	32.2	30.5	29.0	29.5	30.3
Dolomite	200	34.6	29.1	27.7	28.7	30.0
Dolomite	400	31.8	30.1	29.3	28.7	30.0

[1] The cotton received 600 pounds of 6-10-4 fertilizer made from superphosphate (16%), muriate of potash (60%), and ammonium sulfate (20.5%).

Effect of Variety, Season, Location, and Pickings

Seed used in the oil studies were analyzed for protein; the data are presented in Tables 22 and 23.

Effect of variety. Most varieties showed little variation in this character, Table 22. Seed of Half and Half, Hi-Bred, and Qualla No. 2 were higher in protein than other varieties, while Stoneville 2 B, Cook 1255, Cook 144, and Clevewilt were lower. It appears that there has been little attempt to improve varieties of cotton as far as protein content of seed is concerned.

Effect of season. Results from the variety experiment given in Table 22 show that seed produced in 1939 were higher in pro-

TABLE 22. PROTEIN CONTENT OF SEED OF DIFFERENT COTTON VARIETIES GROWN AT NINE LOCATIONS, 1938-39

Variety	Percentage of protein in seed											
	North Alabama				Central Alabama						South Alabama	Av. all locations
	Belle Mina	Alex-andria	Cross-ville	Av.	Alice-ville	Marion Junction	Pratt-ville	Auburn	Lafay-ette	Av.	Monroeville	
						1938						
Cook 144-35	30.0	28.5	26.9	28.5	28.5	28.8	27.2	26.7	25.6	27.3	30.3	28.0
Cook 307	29.1	28.9	26.0	28.1	28.3	28.9	29.8	29.0	29.4	29.1	30.9	29.0
Cook 1255	27.7	30.1	27.6	28.4	25.9	29.2	27.5	25.1	27.5	27.0	30.5	27.9
Clevewilt	30.1	28.5	27.2	28.6	30.6	30.8	27.7	26.2	26.3	28.3	30.5	28.7
D.P.L 11 A	28.3	29.8	28.5	28.8	31.5	31.1	28.1	28.5	26.9	29.3	32.6	29.5
Farm Relief	29.7	29.1	26.9	28.6	27.5	30.4	28.8	29.3	27.7	28.7	32.2	29.0
Half and Half	33.2	30.5	30.3	31.3	33.0	32.8	30.8	30.7	31.0	31.7	33.1	31.7
Misdel	29.9	30.1	26.3	28.8	29.2	29.4	28.8	30.3	28.4	29.2	32.3	29.1
Qualla	29.9	27.0	27.8	28.3	28.2	27.7	28.8	27.9	24.8	27.7	28.8	28.0
Stoneville 2 B	29.5	27.3	25.1	27.3	26.9	30.1	26.4	27.6	28.2	27.8	30.2	27.9
Average	29.8	29.0	27.3	28.7	29.0	29.9	28.4	28.1	27.7	28.6	31.2	28.9
						1939						
Cook 144-36	28.9	29.5	28.7	28.8	29.8	30.6	25.7	29.8	29.6	29.2	30.6	29.1
Cook 307	32.6	32.2	29.3	31.3	30.7	30.6	27.3	30.0	30.6	30.0	30.8	30.4
Cook 1347	31.4	29.4	28.8	29.8	29.7	28.2	26.9	29.3	32.0	29.2	28.8	29.3
Clevewilt	28.7	28.4	27.8	28.3	28.6	29.4	27.1	27.9	31.0	28.7	31.2	28.9
D.P.L. 11 A	33.2	29.7	31.4	31.5	30.7	28.9	28.4	32.5	32.5	30.6	28.7	30.3
Hi-Bred	32.9	31.9	30.2	31.6	32.1	32.1	28.7	31.3	36.8	32.2	29.6	31.7
Mebane	30.8	--	29.9	30.4	29.7	28.4	28.1	27.9	30.5	28.9	28.7	29.3
Misdel	31.7	--	33.0	32.4	32.2	28.9	26.9	30.8	30.7	30.0	30.4	30.5
Qualla No. 2	30.5	--	32.0	31.3	29.9	30.4	30.1	31.8	33.2	31.0	31.6	31.2
Stoneville 2 B	28.5	30.0	31.2	31.0	31.2	29.6	28.3	32.6	32.1	30.8	28.0	30.1
Average	30.9	30.0	30.2	30.5	30.5	29.7	27.7	30.5	31.9	30.0	30.4	30.2

TABLE 23. PROTEIN CONTENT OF SEED FROM FIRST AND SECOND PICKING OF 10 DIFFERENT COTTON VARIETIES GROWN AT 11 LOCATIONS, 1938-39

Picking	Percentage of protein in seed														
	North Alabama				Central Alabama						South Alabama				Av. all locations
	Belle Mina	Alex-andria	Cross-ville	Av.	Alice-ville	Marion Junction	Pratt-ville	Auburn	Lafay-ette	Av.	Brew-ton	Head-land	Monroe-ville	Av.	
								1938							
First	29.5	28.5	26.4	28.1	--	30.2	28.6	28.3	27.0	28.6	28.1	30.0	30.9	29.7	28.8
Second	29.8	29.4	28.0	29.1	--	29.6	28.0	28.1	28.2	28.5	26.7	29.7	31.3	29.3	28.9
Av.	29.7	29.0	27.2	28.6	--	29.9	28.3	28.2	27.6	28.6	27.4	29.9	31.1	29.5	28.8
								1939							
First	30.6	29.4	30.3	30.0	30.1	29.8	28.3	29.9	--	29.6	29.7	31.2	29.6	30.1	30.1
Second	31.1	29.9	29.6	30.1	30.5	29.4	26.9	30.2	--	29.2	30.1	31.4	29.7	30.4	29.9
Av.	30.9	29.7	29.9	30.1	30.3	29.6	27.6	30.1	--	29.5	29.9	31.4	29.7	30.3	30.0

tein than those in 1938. Rainfall in August of 1938 was much less than in the same month of 1939 and according to the results obtained in moisture studies, seed of higher protein content should have been produced in the drier season of 1938. Since this did not occur, one wonders why the difference. The explanation appears to be that yield varied between the two years; in 1938 yields were higher than those in 1939. Also, the stress for moisture was not as great under natural conditions as under controlled conditions used in the test at the Main Station.

Effect of location. Protein content of seed from 10 varieties of cotton grown at different localities is given in Tables 22 and 23. The data show that protein content varies considerably from location to location within any given year, and from year to year at the same location. This indicates that location within itself does not materially affect protein content, but that variations attributable to location are probably due to differences in weather.

Effect of pickings. The average protein content of seed of cotton from 10 varieties by pickings is given in Table 23. The data show that there is no significant variation in protein content between seed of the first picking and those of the second.

Effect of Variety and Soil Moisture

The protein content of seed given in Table 24 was obtained from the experiment with four different varieties under controlled moisture conditions at the Main Station, Auburn. The data show that, while varieties differ in their protein content of seed, all varieties respond similarly to deficiency in soil moisture, i.e.,

TABLE 24. PROTEIN CONTENT OF SEED OF DIFFERENT COTTON VARIETIES GROWN UNDER DIFFERENT SOIL MOISTURE CONDITIONS, MAIN STATION, 1936-38

Variety	Moisture condition of soil	Percentage of protein in seed			
		1936	1937	1938	Average
Mexican Big Boll	Adequate	31.9	29.3	32.0	31.1
	Deficient	--	33.2	31.6	32.4
Cook 1006	Adequate	30.9	29.6	31.3	30.6
	Deficient	--	34.0	31.7	32.9
Clevewilt Strain 5	Adequate	31.2	31.6	31.1	31.3
	Deficient	--	33.7	29.7	31.7
Stoneville 5 A	Adequate	28.8	30.0	31.1	29.9
	Deficient	--	33.0	31.1	32.1

TABLE 25. EFFECTS OF METHODS OF LAND PREPARATION ON PROTEIN CONTENT OF SEED FROM FIRST AND SECOND PICKINGS AT TWO LOCATIONS, 1939

Plot No.	Plot treatment of land preparation studies	Prattville			Belle Mina			Average
		Picking			Picking			
		First	Second	Av.	First	Second	Av.	
		Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
(Ck.) 1	Burst out old row in fall; bed on fertilizer Mar. 20-25	26.5	26.4	26.5	28.3	26.7	27.5	27.0
2	Burst out old row in fall; bed on fertilizer with two furrows Feb. 1	26.5	25.8	26.1	26.6	27.7	27.2	26.7
3	Burst out old row in fall; bed back by bursting old middle Feb. 1; apply fertilizer at side at planting	25.2	28.1	26.7	27.4	29.3	28.4	27.5
4	Burst out old row in fall; bed back by bursting old middle Feb. 1; open bed and put down fertilizer at planting	26.0	26.5	26.3	28.0	28.0	28.1	27.1
(Ck.) 5	Same as Plot 1	26.2	25.9	26.0	29.4	27.6	28.5	27.3
6	Burst out old rows in fall; bed on fertilizer by bursting old middles Mar. 20-25	27.0	28.4	27.7	28.5	30.4	29.5	28.6
7	Burst out old row Mar. 1-15; bed on fertilizer with 2 furrows Mar. 20-25	28.5	28.6	28.6	29.4	29.1	29.3	29.0
8	Double disk Mar. 20; bed lightly on fertilizer Mar. 20-25	25.9	27.1	26.5	29.9	29.0	29.5	28.0

TABLE 25. EFFECTS OF METHODS OF LAND PREPARATION ON PROTEIN CONTENT OF SEED FROM FIRST AND SECOND PICKINGS AT TWO LOCATIONS, 1939 *(continued)*

Plot No.	Plot treatment of land preparation studies	Prattville			Belle Mina			Average
		Picking			Picking			
		First	Second	Av.	First	Second	Av.	
		pct.	*pct.*	*pct.*	*pct.*	*pct.*	*pct.*	*pct.*
(Ck.) 9	Same as Plot 1	26.2	25.5	25.8	29.4	30.4	29.9	27.9
10	Plow out row with bull-tongue Mar. 1-15; bed on fertilizer with 4 furrows Mar. 20-25. Break out balk	26.1	27.1	26.6	29.4	28.5	29.0	27.8
11	Plow broadcast in fall; double disk Mar. 10; bed lightly on fertilizer Mar. 20-25	26.5	26.0	26.2	29.4	30.2	29.8	28.0
12	Plow broadcast in fall; bed lightly on fertilizer Mar. 20-25	26.7	30.8	28.8	31.9	28.9	30.4	29.6
(Ck.) 13	Same as Plot 1	26.6	27.3	27.0	31.7	30.3	31.0	29.0
14	Plow broadcast Mar. 15; bed lightly on fertilizer Mar. 20-25	27.8	28.1	28.0	31.1	27.7	29.4	28.7
15	Plow broadcast Mar. 15; double disk Mar. 20; bed lightly on fertilizer Mar. 20-25	27.1	29.0	28.1	30.1	27.8	28.9	28.5
16	Plow broadcast Mar. 15; double disk Mar. 15; double disk Mar. 20; double disk and bed on fertilizer Mar. 25	25.3	28.6	27.0	32.0	28.9	30.5	28.7
(Ck.) 17	Same as Plot 1	27.2	29.0	28.1	30.8	29.2	30.0	29.1

a deficiency of soil moisture increases the protein content of seed. It may also be noted that there is considerable difference in the response in different seasons. The deficiency in moisture increased the percentage of protein much more in 1937 than in 1938.

Effect of Land Preparation

Seed collected in the studies from plots receiving different methods of preparation were analyzed for protein. The data, Table 25, show considerable variation in the protein content of the seed from the check plots. Since only a small number of samples were used no very definite conclusions can be made. It appears that method of land preparation had little or no effect on the protein content of seed.

Percentage of Fuzz on Seed

In connection with some of the oil and protein studies, percentage of fuzz on the seed was determined; the results are presented in Tables 26 to 30.

Effect of Fertilizer and Soil Moisture

Seed produced at Auburn in Experiment No. 2, "Effect of Fertilizer Treatment and Soil Moisture," were used in this analysis. From data presented in Table 26 and Appendix Table 15,

Table 26. Percentage of Fuzz on Seed of Cotton Receiving Different Fertilizer and Moisture Treatments, Main Station, 1936-38 and 1940

Fertilizer (pounds per acre)	Moisture condition of soil	Percentage of fuzz on seed				
		1936	1937	1938	1940	Average
25,000 Manure	Adequate	12.7	13.4	18.8	16.8	15.4
500 Superphosphate	Deficient	--	17.1	18.6	16.0	17.2
1,000 Superphosphate	Adequate	14.4	12.1	20.2	16.7	15.9
750 Nitrate of Soda	Deficient	--	13.5	18.4	15.1	15.7
250 Muriate						
1,000 Superphosphate	Adequate	15.4	18.3	18.3	15.0	16.8
250 Muriate	Deficient	--	17.2	19.5	17.5	18.1
750 Nitrate of soda	Adequate	14.0	10.2	23.1	17.1	16.1
250 Muriate	Deficient	--	11.1	17.0	17.4	15.2
1,000 Superphosphate	Adequate	13.0	7.5	14.1	14.5	12.3
750 Nitrate of Soda	Deficient	--	13.5	18.3	16.1	16.0
None	Adequate	14.7	16.4	19.1	15.2	16.4
	Deficient	--	17.1	15.7	16.7	16.5

TABLE 27. PERCENTAGE OF FUZZ ON COTTON SEED FROM COTTON GROWN AT TWO LOCATIONS AND RECEIVING DIFFERENT RATES OF POTASH, 1938

Fertilizer (600 pounds per acre of formula)	Percentage of fuzz on seed		
	Crossville	Belle Mina	Average
6-10-0	9.5	9.5	9.5
6-10-2	9.7	8.3	9.0
6-10-4	10.2	9.5	9.9
6-10-8	9.6	8.9	9.3
6-10-16	10.1	8.8	9.5

TABLE 28. PERCENTAGE OF FUZZ ON SEED FROM COTTON GROWN AT THREE LOCATIONS AND RECEIVING CALCIUM OR MAGNESIUM IN THE FERTILIZER,[1] 1938

Lime to cotton		Percentage of fuzz on seed			
Source	Rate per acre	Prattville	Crossville	Belle Mina	Average
	Pounds				
0	0	15.3	16.8	9.0	13.7
Calcium carbonate	200	14.2	15.8	11.4	13.8
Dolomite	200	14.9	15.1	10.9	13.6
Dolomite	400	14.2	15.8	9.5	13.2

[1] The cotton received 600 pounds per acre of a 6-10-4 fertilizer made from superphosphate (16%), muriate of potash (60%), and ammonium sulfate (20.5%).

it appears that soil moisture had very little effect on fuzz. Use of large amounts of nitrogen and phosphorus without potash resulted in lowering fuzz percentage under a condition of ample moisture but they had no effect when moisture was deficient.

Effect of Different Rates of Potash

Treatment and history of the experiment from which seed were collected are described under the oil content studies, "Effect of Potash." Results given in Table 27 show that in this experiment percentage of potash in the fertilizer had no effect on percentage of fuzz on seed.

Effect of Calcium and Magnesium

Treatment of this experiment is described under the oil content studies, "Influence of Calcium and Magnesium." From the results (Table 28) it is apparent that application of calcium or magnesium had no effect on fuzz content of seed.

TABLE 29. PERCENTAGE OF FUZZ ON SEED OF DIFFERENT COTTON VARIETIES GROWN AT EIGHT LOCATIONS, 1938-39

Variety	Percentage of fuzz on seed											
	North Alabama				Central Alabama						South Alabama	Av. all locations
	Belle Mina	Alex-andria	Cross-ville	Av.	Alice-ville	Marion Junction	Pratt-ville	Auburn	Lafay-ette	Av.	Monroeville	
1938												
Cook 144-35	13.8	14.1	12.7	13.5	11.9	16.3	12.9	13.5	14.0	13.7	10.7	13.3
Cook 307	14.3	15.2	14.2	14.6	15.5	14.9	12.1	13.4	14.4	14.1	10.2	13.8
Cook 1255	16.3	16.9	14.5	15.9	14.9	14.6	11.9	14.2	14.5	14.0	11.6	14.4
Clevewilt	14.8	15.1	13.6	14.5	10.8	16.1	11.9	14.4	13.7	13.4	10.7	13.4
D.P.L. 11 A	15.1	15.8	14.2	15.0	12.0	15.8	11.7	14.2	14.6	13.7	11.1	13.8
Farm Relief	15.2	13.5	13.7	14.1	10.9	14.8	11.0	12.5	12.1	12.3	10.3	12.7
Half and Half	13.0	13.6	12.1	12.9	12.6	13.0	10.1	12.2	11.6	11.9	11.3	12.2
Misdel	17.9	17.0	15.1	16.7	17.0	16.6	14.4	17.0	16.4	16.3	13.5	16.1
Qualla	15.9	14.1	13.6	14.5	12.6	16.3	10.7	14.8	16.1	14.1	11.7	14.0
Stoneville 2 B	16.5	15.3	15.8	15.9	13.8	15.8	11.8	15.9	15.1	14.5	13.2	14.8
Average	15.3	15.1	14.0	14.8	13.2	15.4	11.7	14.2	14.3	13.8	11.4	13.9
1939												
Cook 144-36	13.2	12.5	12.9	12.9	12.6	14.6	15.0	12.7	12.8	13.5	13.3	13.3
Cook 307	12.4	13.2	12.2	12.6	13.6	14.0	14.7	12.9	10.8	13.2	14.3	13.1
Cook 1347	14.5	13.7	16.4	14.9	14.6	15.3	15.2	12.3	10.6	13.6	15.8	14.3
Clevewilt	14.1	12.1	11.1	12.4	13.7	14.6	13.3	13.0	13.9	13.7	14.2	13.3
D.P.L. 11 A	13.5	12.2	12.8	12.8	9.4	14.2	15.3	12.9	10.1	12.4	15.2	12.8
Hi-Bred	13.6	12.0	12.6	12.7	12.6	14.1	15.8	12.7	12.1	13.5	13.7	13.2
Mebane	15.0	--	12.1	13.6	13.1	14.1	16.5	12.0	10.9	13.3	14.3	13.5
Misdel	14.6	--	10.5	12.6	14.5	14.5	17.1	13.2	12.0	14.3	14.1	13.8
Qualla No. 2	15.2	--	13.5	14.4	13.9	18.5	17.0	14.0	13.5	15.4	15.8	15.2
Stoneville 2 B	14.9	14.7	11.8	13.8	13.6	15.1	14.5	14.9	12.5	14.1	14.9	14.1
Average	14.1	12.9	12.6	13.2	13.2	14.9	15.4	13.1	11.9	13.7	14.6	13.6

TABLE 30. PERCENTAGE OF FUZZ ON SEED FROM FIRST AND SECOND PICKING OF 10 DIFFERENT VARIETIES OF COTTON GROWN AT 11 LOCATIONS, 1938-39

Picking	Percentage of fuzz on seed														
	North Alabama				Central Alabama						South Alabama				Av. all locations
	Belle Mina	Alex-andria	Cross-ville	Av.	Alice-ville	Marion Junction	Pratt-ville	Auburn	Lafay-ette	Av.	Brew-ton	Head-land	Monroe-ville	Av.	
								1938							
First	16.4	15.1	14.5	15.3	13.2	15.1	10.7	12.4	13.3	12.9	15.7	12.1	11.4	13.1	13.6
Second	14.2	15.0	13.4	14.2	–	15.7	12.5	16.2	15.2	14.9	13.6	15.1	11.5	13.4	14.2
Av.	15.3	15.1	14.0	14.8	13.2	15.4	11.6	14.3	14.3	13.8	14.7	13.7	11.4	13.3	13.9
								1939							
First	13.0	13.4	13.7	13.4	12.6	14.9	15.2	11.3	11.9	13.2	15.4	13.6	14.6	14.5	13.6
Second	15.2	12.4	11.4	13.0	13.7	14.8	15.6	14.7	–	14.7	15.0	14.0	14.6	14.5	14.1
Av.	14.1	12.9	12.6	13.2	13.2	14.9	15.4	13.0	11.9	13.7	15.2	13.8	14.6	14.5	13.8

Effect of Variety, Season, Location, and Pickings

The results of the fuzz determinations of the cotton grown in the variety tests are given in Tables 29 and 30.

Effect of variety. The data, Table 29, show that there is considerable difference in varieties in percentage of fuzz. In 1938, fuzz percentage was high in Misdel, Stoneville 2 B, and Cook 1255, and low in Half and Half, and Farm Relief. In 1939, it was high in Qualla No. 2, Cook 1347, and Stoneville 2 B, and low in Hi-Bred, Cook 307, and D.P.L. 11.

Effect of season. Season did not have any consistent effect on the percentage of fuzz. In some localities the fuzz varied greatly from season to season, whereas in another the variation would be reversed in the same season. A study of the rainfall records does not offer any explanation of the variations noted.

Effect of location. This effect was very marked but varies from year to year. In 1938 seed at Prattville and Monroeville had a low percentage of fuzz, while those at Belle Mina, Alexandria, and Marion Junction had a high percentage. In 1939 it was low at Lafayette, Crossville, and Alexandria, and high at Prattville, Marion Junction, and Monroeville. In any one year differences between locations are very consistent, but the next year the variations may be in the opposite direction. There appears to be no plausible explanation for the wide variations. Experiments at Auburn with cotton under controlled conditions of moisture and fertilizer do not offer any clue as to the reason for the variations.

Effect of pickings. Data reported in Table 30 show that the average percentage of fuzz on seed of the second picking was higher than that from the first, but this trend is not consistent at different places.

Effect of Variety and Soil Moisture

Treatments for the plots used are previously described under "Variety and Soil Moisture Studies." The data, Table 31 and Appendix Table 33, show that Mexican Big Boll had a much higher percentage of fuzz than Cook 1006, Clevewilt, and Stoneville 5 A. There appeared to be no consistent effect attributable to soil moisture variations.

TABLE 31. PERCENTAGE OF FUZZ ON SEED OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE, MAIN STATION, 1936-38

Variety	Moisture condition of soil	Percentage of fuzz on seed			
		1936	1937	1938	Average
Mexican Big Boll	Adequate	14.4	12.1	20.2	15.6
	Deficient	-	13.5	18.4	16.0
Cook 1006	Adequate	11.1	10.0	12.9	11.3
	Deficient	--	6.2	12.6	9.4
Clevewilt Strain 5	Adequate	12.2	8.6	12.9	11.2
	Deficient	--	11.6	13.2	12.4
Stoneville 5 A	Adequate	9.5	11.3	12.6	11.1
	Deficient	--	11.7	14.5	13.1

FIBER PROPERTIES

Effect of Soil Moisture

Lint of cotton grown in the seed cotton studies, "Effect of Soil Moisture Experiment No. 1," was tested as described under experimental methods. The data, Table 1 (also Appendix Table 1) show that the fiber grown under a condition of adequate moisture was longer, weaker, more mature, and had less weight per inch than that grown under drought conditions.

Effect of Fertilizer and Soil Moisture

The lint produced in seed cotton study experiment, "Effect of Fertilizer Treatment and Soil Moisture on Various Properties of Cotton, Experiment No. 2," was analyzed and results are given in Tables 32 to 36. The results are also shown by weeks in Tables 16 to 25 of the Appendix.

Fiber length at upper 25 per cent point. Data for fiber length at the upper 25 per cent point averaged by years are given in Table 32. The fiber length was increased by adequate soil moisture. Under a condition of adequate soil moisture, there seems to be little effect of fertilizers on length of lint. Thus, it appears that soil moisture is the determining factor in length of fibers produced by a given variety.

Mean fiber length. The data by years, Table 33, show that mean fiber length is affected the same way as fiber length at the upper 25 per cent point; that is, it is reduced by a deficiency in

TABLE 32. LENGTH OF LINT AT THE UPPER 25 PER CENT POINT OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE WITH DIFFERENT FERTILIZER TREATMENTS, MAIN STATION, 1933-38 AND 1940

Fertilizer treatment (pounds per acre)	Moisture condition of soil	Length of lint at upper 25 per cent point							
		1933	1934	1935	1936	1937	1938	1940	Av.
		In.	*In.*	*In.*	*In.*	*In.*	*In.*	*In.*	*In.*
25,000 Manure	Adequate	.90	.95	.99	1.00	1.00	1.02	.93	.97
500 Superphosphate	Deficient	.94	.83	.95	--	.90	1.03	.89	.92
1,000 Superphosphate	Adequate	.92	.93	.98	.98	1.01	.96	1.01	.97
750 Nitrate of Soda	Deficient	.87	.84	.92	--	.91	.92	.87	.89
250 Muriate									
1,000 Superphosphate	Adequate	.94	.89	--	.99	.96	.95	.88	.94
250 Muriate	Deficient	.90	.89	.91	--	.93	1.01	.82	.91
750 Nitrate of soda	Adequate	.89	.98	.97	1.03	.95	.95	.92	.96
250 Muriate	Deficient	.91	.87	--	--	.93	.90	.82	.89
1,000 Superphosphate	Adequate	.94	.95	.95	1.01	.97	.97	.99	.97
750 Nitrate of Soda	Deficient	.88	.88	.91	--	.94	.90	.89	.90
None	Adequate	.95	.97	.98	1.03	1.00	1.00	.95	.98
	Deficient	.92	.91	.94	--	.96	.92	.90	.93

TABLE 33. MEAN LENGTH OF LINT OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE WITH DIFFERENT FERTILIZER TREATMENTS, MAIN STATION, 1933-38 AND 1940

Fertilizer treatment (pounds per acre)	Moisture condition of soil	Mean length of lint							
		1933	1934	1935	1936	1937	1938	1939	Av. all years
		In.	*In.*	*In.*	*In.*	*In.*	*In.*	*In.*	*In.*
25,000 Manure	Adequate	.65	.68	.72	.71	.73	.76	.64	.70
500 Superphosphate	Deficient	.68	.58	.68	--	.65	.77	.62	.66
1,000 Superphosphate	Adequate	.66	.68	.70	.70	.72	.68	.74	.70
750 Nitrate of Soda	Deficient	.62	.60	.66	--	.66	.67	.59	.63
250 Muriate									
1,000 Superphosphate	Adequate	.68	.64	--	.71	.70	.67	.63	.68
250 Muriate	Deficient	.64	.63	.64	--	.67	.74	.56	.64
750 Nitrate of soda	Adequate	.63	.72	.70	.74	.70	.68	.65	.69
250 Muriate	Deficient	.65	.63	--	--	.68	.63	.57	.63
1,000 Superphosphate	Adequate	.68	.71	.69	.72	.72	.70	.73	.71
750 Nitrate of Soda	Deficient	.60	.64	.64	--	.69	.63	.64	.64
None	Adequate	.69	.71	.71	.75	.74	.71	.68	.71
	Deficient	.66	.67	.68	--	.71	.66	.63	.67

moisture, and fertilizer applications have little or no effect on mean fiber length. From a comparison made between the effect on lint length at the upper 25 per cent point and the mean length, it appears that the length at the upper 25 per cent is reduced approximately the same as the mean length. This indicates that

factors reducing length of lint exert as great an influence on long fibers as on short ones.

Strength of lint. The data presented in Table 34 show that breaking strength was increased by deficiency in soil moisture. Fertilizer treatment appeared to have a little effect on this fiber character. Application of phosphate and potash without nitrogen increased breaking strength slightly. Under a condition of deficient soil moisture, applications of nitrogen increased breaking strength. This is due to the fact that nitrogen stimulates vegetative growth of the cotton plant, and in turn brings about a greater water stress than on plots receiving only phosphate and potash or no fertilizer.

Weight per inch. The mean weight per inch, as shown by data in Table 35, was not greatly affected by any treatment. Deficiencies in soil moisture decreased weight per inch very slightly. The application of fertilizer had very little effect on this character. Cotton receiving no fertilizer or only phosphate and potash had slightly higher mean weight per inch of fiber than cotton receiving nitrogen.

Percentage of immature fibers. The data for percentage of immature fibers averaged by years are reported in Table 36. These show that soil moisture is the dominant factor in determining

TABLE 34. BREAKING STRENGTH OF FIBERS OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE WITH DIFFERENT FERTILIZER TREATMENTS, MAIN STATION, 1933-38 AND 1940

Fertilizer treatment (pounds per acre)	Moisture condition of soil	Breaking strength of lint							
		1933	1934	1935	1936	1937	1938	1940	Av. all years
		1,000 pounds per square inch							
25,000 Manure	Adequate	63	54	53	54	52	50	60	55
500 Superphosphate	Deficient	64	60	63	--	63	57	68	63
1,000 Superphosphate	Adequate	60	59	55	55	50	48	60	55
750 Nitrate of Soda	Deficient	68	67	70	--	62	57	71	66
250 Muriate									
1,000 Superphosphate	Adequate	66	60	--	63	48	49	61	58
250 Muriate	Deficient	68	64	63	--	54	51	66	61
750 Nitrate of soda	Adequate	58	62	61	59	53	51	54	57
250 Muriate	Deficient	70	64	--	--	58	52	69	63
1,000 Superphosphate	Adequate	65	64	65	69	56	53	57	61
750 Nitrate of Soda	Deficient	66	70	70	--	57	57	69	65
None	Adequate	62	64	64	67	53	52	49	59
	Deficient	62	68	66	--	57	51	61	61

percentage of immature fibers. This percentage is increased by a deficiency in soil moisture. Fertilizer treatment had little or no effect on percentage of immature fibers.

TABLE 35. MEAN WEIGHT PER INCH OF FIBERS OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE WITH DIFFERENT FERTILIZER TREATMENTS, MAIN STATION, 1933-38 AND 1940

Fertilizer treatment (pounds per acre)	Moisture condition of soil	Mean weight per inch of fibers							
		1933	1934	1935	1936	1937	1938	1940	Av.
		10^{-4} Milligrams							
25,000 Manure	Adequate	64	59	55	57	61	60	66	60
500 Superphosphate	Deficient	54	65	56	--	57	53	69	59
1,000 Superphosphate	Adequate	64	61	52	56	59	67	63	60
750 Nitrate of Soda	Deficient	56	67	56	--	56	56	68	60
250 Muriate									
1,000 Superphosphate	Adequate	61	64	--	57	67	67	71	65
250 Muriate	Deficient	56	65	62	--	66	62	72	64
750 Nitrate of soda	Adequate	64	59	58	57	70	65	69	63
250 Muriate	Deficient	53	62	--	--	65	61	70	62
1,000 Superphosphate	Adequate	61	59	56	52	64	65	60	60
750 Nitrate of Soda	Deficient	55	58	57	--	62	59	64	59
None	Adequate	63	59	57	57	68	65	69	63
	Deficient	60	60	61	--	62	62	67	62

TABLE 36. PERCENTAGE OF IMMATURE FIBERS OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE WITH DIFFERENT FERTILIZER TREATMENTS, MAIN STATION, 1933-38 AND 1940

Fertilizer treatment (pounds per acre)	Moisture condition of soil	Percentage of immature fibers							
		1933	1934	1935	1936	1937	1938	1940	Av.
25,000 Manure	Adequate	50	52	27	19	29	24	39	34
500 Superphosphate	Deficient	53	54	46	--	34	29	41	43
1,000 Superphosphate	Adequate	53	51	27	20	29	23	38	34
750 Nitrate of soda	Deficient	56	53	35	--	30	37	39	42
250 Muriate									
1,000 Superphosphate	Adequate	53	51	--	21	28	33	38	37
250 Muriate	Deficient	52	51	29	--	26	28	38	37
750 Nitrate of Soda	Adequate	57	50	24	19	26	33	30	34
250 Muriate	Deficient	57	53	--	--	29	38	36	43
1,000 Superphosphate	Adequate	53	49	23	25	29	26	30	34
750 Nitrate of Soda	Deficient	58	51	27	--	30	38	35	40
None	Adequate	58	45	21	17	26	32	28	32
	Deficient	56	51	28	--	30	32	31	38

Effect of Soil Type

Fiber from cotton grown on Norfolk sandy loam in the soil type studies had a higher breaking strength and a higher percentage of immature fibers than did cotton grown on Deer Creek loam, Table 7. Cotton grown in the two soil types had approximately the same mean fiber weight per inch and approximately the same length. The explanation for differences in breaking strength and maturity appears to be due to the fact that there

TABLE 37. EFFECT OF SOIL MOISTURE ON VARIOUS PROPERTIES OF SEED AND FIBER OF DIFFERENT VARIETIES OF COTTON, 1937-38

Character measured	Year	Variety: Mexican Big Boll		Cook 1006		Clevewilt Strain 5		Stoneville 5 A	
		Moisture condition of soil							
		Adequate	Deficient	Adequate	Deficient	Adequate	Deficient	Adequate	Deficient
Weight of seed cotton per boll, grams	1937	7.55	6.15	5.76	4.70	6.21	4.75	5.87	4.75
	1938	6.83	5.47	5.35	4.87	5.41	4.18	5.40	4.33
	Av.	7.19	5.81	5.56	4.79	5.81	4.47	5.64	4.54
Seed per boll, number	1937	33.2	34.3	32.6	33.5	31.2	30.9	31.4	31.4
	1938	29.9	29.6	27.5	28.5	27.1	27.5	29.0	27.5
	Av.	31.6	32.0	30.1	31.0	29.2	29.2	30.2	29.5
Weight per seed, milligrams	1937	144	109	111	89	123	97	116	92
	1938	152	124	123	112	125	100	117	103
	Av.	148	117	117	101	124	99	117	98
Weight of lint per seed, milligrams	1937	83	70	65	52	76	56	71	59
	1938	77	61	71	59	74	52	69	54
	Av.	80	66	68	56	75	54	70	57
Percentage of lint in seed cotton, per cent	1937	36.5	39.1	37.0	36.9	38.0	36.6	38.0	38.9
	1938	33.8	33.0	36.5	34.5	37.2	34.0	37.0	34.4
	Av.	35.7	36.1	36.8	35.7	37.6	35.3	37.5	36.7
Breaking strength of fibers, 1,000 pounds per sq. in.	1937	50	62	53	56	55	59	49	57
	1938	48	57	54	56	58	57	52	57
	Av.	49	60	54	56	57	58	51	57
Mean fiber weight per inch, 10^{-4}, milligrams	1937	59	56	66	61	59	55	61	58
	1938	67	56	65	59	63	53	64	55
	Av.	63	56	66	60	61	54	63	57
Immature fibers, per cent	1937	29	30	22	35	31	42	30	35
	1938	23	37	39	44	46	47	44	46
	Av.	26	34	31	40	39	45	37	41
Mean length of fibers, inches	1937	.72	.66	.71	.68	.79	.70	.82	.69
	1938	.68	.67	.68	.63	.68	.55	.66	.65
	Av.	.70	.67	.70	.65	.74	.63	.74	.67
Fiber length at upper 25 per cent point, inches	1937	1.01	.91	.97	.91	1.07	.98	1.12	.96
	1938	.96	.92	.99	.94	.99	.87	.98	.97
	Av.	.99	.92	.98	.93	1.03	.93	1.05	.97

was a longer period from blossom to mature, open boll in cotton grown in Deer Creek loam. Cotton grown on this soil did not mature as rapidly as did cotton grown in Norfolk sandy loam.

Effect of Variety and Soil Moisture

In connection with the seed cotton studies, "Effect of Fertilizer Treatment and Soil Moisture, Experiment No. 2," four varieties of cotton were grown under two conditions of soil moisture in 1937 and 1938. Analyses of the fiber obtained in this study are reported in Table 37 and Appendix Tables 34 to 38, and show that varieties differ in their breaking strength and other characteristics. Breaking strength was affected differently in different varieties by moisture variations. Mexican Big Boll variety and Stoneville 5 A had a much larger variation in breaking strength due to moisture variations than Cook and Clevewilt Strain 5 varieties. This is not enough evidence to be conclusive, but it strongly indicates that breaking strength of some varieties would not be affected by adverse conditions as much as that of others. Therefore, as far as breaking strength is concerned, these varieties under all moisture conditions would produce a more uniform staple than others. The fiber weight per inch was reduced slightly in all varieties by a deficiency in soil moisture, and varieties did not materially differ in this respect. Neither did they materially differ in the effect on percentage of immature fibers. Immaturity was increased in all cases by a deficiency of soil moisture. Length of fiber was reduced in all varieties by a deficiency in soil moisture. Varieties did not seem to differ in their response to deficiency in soil moisture, as far as the length of lint is concerned.

SUMMARY AND CONCLUSIONS

The investigation consisted of a series of studies to determine the influence of certain environmental factors, viz: soil moisture, soil type, preparation of soil, fertilizers and organic matter on seed, and fiber properties of cotton. One series of studies was made under controlled conditions with variables of soil moisture, soil type, fertilizers, and organic matter, using a pure line strain of Mexican Big Boll cotton. Three other commercial varieties of cotton were tested with soil moisture as a variable to determine if varieties responded differently. Another series of tests were conducted under field conditions with commercial

varieties of cotton with variables of variety, fertilizer, preparation of soil, location, and picking date.

Seed cotton characters studied were: weight of lint and seed per boll, weight per seed, weight of lint per seed, and ginning percentage. Percentages of oil, of protein, and of fuzz on the seed were determined. The fiber properties measured were tensile strength, maturity, weight per inch, mean length, and length at the upper 25 per cent point. Not all of these characters were measured in all tests.

Weight per boll (seed plus lint) was affected by soil moisture, and fertilizer, but was not affected by soil type. The greatest reduction was by moisture deficiency. It was reduced to a lesser extent by omitting either nitrogen, phosphorus or potash from the fertilizer. Under a condition of adequate soil moisture, the omission of nitrogen produced a greater reduction than did omission of either phosphorus or potash. Under a condition of drought, omission of nitrogen produced a reduction, but omission of phosphorus or potash produced no reduction.

Weight per seed was affected by the same factors and in the same manner as weight per boll, except that under a drought condition fertilizer had no effect.

Weight of lint per seed was not significantly affected by fertilizer treatment or by type of soil, but it was reduced by drought.

Percentage of lint was increased by a deficiency in soil moisture or by omitting either nitrogen, phosphorus, or potash from the fertilizer. Omission of nitrogen increased the lint percentage to a greater extent than did omission of phosphorus or potash. Type of soil did not affect lint percentage.

Weight per seed is varied much more by environmental conditions than is weight of lint per seed. Therefore, the principal reason for a variation in lint percentage is due to change in weight per seed.

Oil content of seed was increased by favorable moisture, by application of phosphorus and potash, and by absence of disease. Seed from cotton grown on Deer Creek loam had a higher oil content than those of cotton grown on Norfolk sandy loam soil. Oil content was not affected by calcium or magnesium added as lime, or by preparation of soil. Application of nitrogen decreased the oil content. Oil content of the first picking was slightly higher than that of the second picking. There was a variation in oil content due to varieties. Location had a very marked effect on oil content, but this varied from season to season. Thus, one

locality might produce cotton that has a high oil content one season and a low one the next. This is probably due to rainfall variation. Varieties differ in the oil content of seed but all varieties tested responded in the same manner to variations in soil moisture.

Protein content of seed was increased by drought and by application of nitrogen fertilizers, and was decreased by application of phosphorus and potash without nitrogen. Calcium, or magnesium had little or no effect on protein. There was no significant effect on protein content attributable to land preparation or picking. Varieties differ in protein content of seed. Location affected protein content, but this varied from year to year, indicating that this variation may be due to moisture or other factors. No location consistently produced cotton with higher protein content than some other location.

Percentage of fuzz appeared to be principally determined by variety and location. Variation due to locality was not consistent from year to year. These studies do not offer any explanation as to the cause of variations in fuzz.

Fiber of cotton grown with adequate soil moisture was longer, weaker, more mature, and had a slightly greater weight per inch than cotton grown with deficient moisture.

Under a condition of adequate soil moisture, fertilizer had only a small effect on any fiber property. Use of phosphate and potash without nitrogen produced a slight decrease in length and breaking strength of fibers and produced a slight increase in weight per inch. Under a condition of drought, applications of nitrogen increased the breaking strength and weight per inch, but decreased the length of fibers.

Moisture condition of soil was the most important factor affecting fiber properties.

Under the same environmental conditions, cotton grown in Norfolk sandy soil produced fibers that were stronger and more immature than those from cotton grown in Deer Creek loam soil. Other fiber properties were equal in cotton grown in the two soils.

Varieties differ in their fiber properties and the degree to which the fiber properties were affected by changes in the environment.

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APPENDIX

TABLE 1. EFFECT OF SOIL MOISTURE ON VARIOUS PROPERTIES OF SEED AND FIBER OF COTTON, AVERAGES BY 7-DAY PERIODS, 1928-32

Character measured	Week of blooming	Adequate soil moisture						Deficient soil moisture					
		Year						Year					
		1928	1929	1930	1931	1932	Av. all years	1928	1929	1930	1931	1932	Av. all years
Breaking strength of fibers 1,000 pounds per square inch	1	80	83	86	74	72	79	89	81	87	84	77	84
	2	80	83	85	73	70	78	87	84	86	86	75	84
	3	79	85	85	72	66	77	81	84	82	81	72	80
	4	77	85	72	69	68	74	82	87	74	78	--	80
	5	84	85	74	68	67	76	--	84	70	73	--	76
	6	--	89	82	73	--	81	--	--	--	76	--	76
Weighted av.[1]		79	85	81	70	68	77	85	84	83	80	75	81
Mean fiber weight per inch, 10^{-4} milligrams	1	59	58	64	67	56	61	61	61	62	65	60	62
	2	58	56	63	66	58	60	58	60	65	66	60	62
	3	62	59	65	71	60	63	56	58	71	75	57	63
	4	57	57	60	69	57	60	57	55	65	71	--	62
	5	60	54	58	71	60	61	--	60	57	67	--	61
	6	--	57	70	62	--	63	--	--	--	64	--	64
Weighted av.		60	56	63	68	59	61	58	59	67	71	59	63
Immature fibers per cent	1	15	16	28	66	37	32	21	18	57	68	48	42
	2	28	19	38	65	35	37	19	19	54	72	49	43
	3	17	17	42	69	32	35	17	26	47	68	49	41
	4	18	23	51	69	38	40	24	23	45	69	--	40
	5	20	21	52	64	34	38	--	22	52	70	--	48
	6	--	15	34	63	--	37	--	--	--	65	--	--
Weighted av.		19	20	42	66	34	36	20	21	51	69	49	42
Mean length of fibers in inches	1	.73	.80	.66	.63	.74	.71	.70	.74	.62	.58	.70	.67
	2	.74	.80	.70	.64	.75	.73	.72	.74	.66	.59	.70	.68
	3	.71	.76	.70	.60	.65	.68	.73	.71	.63	.55	.66	.66
	4	.69	.75	.63	.62	.68	.67	.68	.72	.62	.61	--	.66
	5	.67	.78	.69	.62	.68	.69	--	.66	.69	.59	--	.65
	6	--	.74	.61	.62	--	.66	--	--	--	.54	--	.54
Weighted av.		.71	.77	.68	.62	.70	.70	.71	.73	.64	.58	.69	.67

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 1. EFFECT OF SOIL MOISTURE ON VARIOUS PROPERTIES OF SEED AND FIBER OF COTTON, AVERAGES BY 7-DAY PERIODS, 1928-32 *(Continued)*

Character measured	Week of blooming	Adequate soil moisture						Deficient soil moisture					
		Year						Year					
		1928	1929	1930	1931	1932	Av. all years	1928	1929	1930	1931	1932	Av. all years
Fiber length at upper 25 per cent point in inches	1	1.02	1.04	.90	.89	.99	.97	.96	.96	.85	.81	.93	.90
	2	1.01	1.05	.95	.88	1.01	.98	.96	.99	.91	.81	.94	.92
	3	.99	1.02	.93	.84	.89	.93	.98	.95	.85	.77	.91	.89
	4	.97	.96	.89	.85	.93	.92	.93	.97	.85	.82	--	.89
	5	.93	1.01	.94	.86	.94	.94	--	.91	.95	.83	--	.90
	6	--	.96	.86	.86	--	.89	--	--	--	.76	--	--
Weighted av.		1.00	1.00	.92	.85	.95	.94	.96	.97	.87	.80	.93	.91
Percentage of lint in seed cotton, per cent	1	36.0	37.4	37.0	39.1	34.9	36.9	37.9	40.2	38.6	37.6	37.0	38.3
	2	36.5	36.9	35.9	38.8	35.2	36.7	37.9	39.6	37.3	39.9	38.5	38.6
	3	35.4	37.2	38.1	38.9	36.0	37.1	37.1	38.7	40.4	41.6	40.1	39.6
	4	35.3	39.9	37.0	38.6	33.6	36.9	39.4	38.8	39.1	40.3	--	39.4
	5	36.9	40.3	35.5	38.6	35.3	37.3	--	37.9	35.1	40.0	--	37.7
	6	--	39.1	39.0	38.8	--	39.0	--	--	--	40.2	--	40.2
Weighted av.		35.7	38.9	37.1	38.7	35.3	37.1	38.2	39.3	39.2	40.7	38.7	39.2
Weight of seed cotton per boll, grams	1	7.96	7.85	6.64	6.57	7.00	7.20	6.86	6.40	5.05	6.11	5.56	6.00
	2	8.08	8.41	6.19	6.90	7.59	7.43	7.52	7.34	4.86	5.93	6.16	6.36
	3	8.56	7.98	7.22	6.79	8.12	7.73	7.47	7.00	4.95	6.16	5.76	6.27
	4	7.39	7.06	7.28	7.65	8.23	7.52	5.56	6.72	6.03	6.37	--	6.17
	5	7.16	7.11	6.68	8.25	7.46	7.33	--	5.24	5.24	6.11	--	5.53
	6	--	7.05	5.99	7.47	--	6.84	--	--	--	5.64	--	5.64
Weighted av.		8.12	7.42	6.85	7.54	7.71	7.53	6.97	6.80	5.00	6.15	5.90	6.16

(continued)

TABLE 1. EFFECT OF SOIL MOISTURE ON VARIOUS PROPERTIES OF SEED AND FIBER OF COTTON, AVERAGES BY 7-DAY PERIODS, 1928-32 *(Continued)*

Character measured	Week of blooming	Adequate soil moisture						Deficient soil moisture					
		Year						Year					
		1928	1929	1930	1931	1932	Av. all years	1928	1929	1930	1931	1932	Av. all years
Number of seed per boll	1	29.3	29.2	30.4	25.5	28.6	28.6	30.7	27.2	24.9	26.6	26.4	27.2
	2	30.3	32.8	26.1	26.7	30.6	29.3	32.3	31.0	22.4	28.4	29.4	28.7
	3	31.4	34.9	29.9	26.6	34.8	31.5	32.0	31.9	24.4	29.6	29.7	29.5
	4	29.5	31.4	29.8	30.7	34.5	31.2	28.8	31.5	28.8	30.5	--	29.9
	5	28.8	31.8	29.1	34.1	33.8	31.5	--	26.9	26.5	30.3	--	27.9
	6	--	30.5	27.0	32.7	--	30.1	--	--	--	29.8	--	29.8
Weighted av.		30.5	32.2	29.0	30.8	32.5	31.0	31.2	30.0	24.4	29.7	28.8	28.8
Weight per seed in milligrams	1	171	168	138	157	159	159	137	141	124	143	133	136
	2	169	162	152	158	161	160	144	133	136	126	129	134
	3	176	144	149	156	149	155	147	134	121	122	116	128
	4	162	135	154	153	158	152	116	130	127	125	--	125
	5	158	133	148	149	143	146	--	121	128	121	--	123
	6	--	141	135	140	--	139	--	--	--	113	--	113
Weighted av.		171	141	148	150	154	153	138	137	125	123	126	130
Weight of lint per seed in milligrams	1	96	101	81	101	85	93	86	95	78	87	78	85
	2	97	95	85	100	87	93	89	94	81	83	81	86
	3	97	85	92	99	84	91	87	85	82	87	78	84
	4	89	90	90	96	80	89	77	83	82	84	--	82
	5	92	90	81	93	78	87	--	74	69	81	--	75
	6	--	91	87	89	--	89	--	--	--	76	--	76
Weighted av.		95	90	88	95	84	90	85	89	80	84	79	83

TABLE 2. AVERAGE WEIGHT PER BOLL OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF ADEQUATE SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-38 AND 1940

Fertilizer per acre, pounds	Week of blooming	Year							
		1933	1934	1935	1936	1937	1938	1940	Av. all years
		Average weight per boll in grams							
25,000 Manure	1	8.70	8.23	8.27	8.63	7.42	8.89	7.50	8.23
500 Superphosphate	2	8.49	8.09	8.55	8.42	8.38	7.73	7.09	8.11
	3	8.07	7.96	8.11	8.19	7.86	6.66	6.57	7.63
	4	7.43	8.01	7.90	7.49	6.72	6.43	6.53	7.22
	5	7.13	--	8.67	7.48	6.85	5.80	6.75	7.11
	6	--	--	--	7.12	--	5.37	7.00	6.50
Weighted av.[1]		8.31	8.07	8.28	7.98	7.66	6.74	6.66	7.67
1,000 Superphosphate	1	9.08	7.91	8.40	7.87	6.30	7.58	6.50	7.66
750 Nitrate of Soda	2	8.87	7.78	7.95	7.87	7.87	7.05	6.07	7.64
250 Muriate	3	8.13	7.87	7.57	7.72	7.94	9.11	6.08	7.77
	4	7.94	7.18	7.23	7.30	7.18	7.00	6.34	7.17
	5	7.70	7.42	7.04	7.10	6.43	6.27	6.26	6.89
	6	7.72	--	--	7.42	--	6.08	6.21	6.86
Weighted av.		8.58	7.75	7.67	7.60	7.55	6.83	6.23	7.46
1,000 Superphosphate	1	8.14	7.13	7.90	7.21	7.48	8.10	5.83	7.40
250 Muriate	2	7.49	6.34	7.31	6.94	6.38	6.02	6.21	6.67
	3	7.13	6.14	6.60	6.47	6.40	5.15	5.70	6.23
	4	6.73	5.72	--	6.28	6.04	4.35	5.40	5.75
	5	6.37	--	--	7.21	5.17	6.20	5.18	6.03
	6	--	--	--	6.41	--	--	7.00	6.71
Weighted av.		7.54	6.51	7.23	6.79	6.34	5.56	5.67	6.52
750 Nitrate of Soda	1	8.73	6.97	7.47	7.66	6.10	6.81	4.25	6.86
250 Muriate	2	8.71	7.37	7.99	7.60	7.13	6.54	5.55	7.27
	3	8.07	7.52	7.48	7.32	6.96	5.70	4.98	6.86
	4	7.43	7.64	7.31	6.89	6.26	5.31	5.48	6.62
	5	7.43	--	7.75	6.79	6.52	6.14	5.71	6.72
	6	6.70	--	--	6.73	--	5.30	6.75	6.37
Weighted av.		8.28	7.37	7.61	7.26	6.78	6.03	5.33	6.95
1,000 Superphosphate	1	9.28	7.92	7.96	7.62	6.19	7.99	7.75	7.82
750 Nitrate of Soda	2	8.97	7.34	7.70	6.70	7.24	7.21	6.03	7.31
	3	8.24	7.25	7.17	6.29	6.95	6.86	6.22	7.00
	4	7.76	7.12	6.70	5.73	6.23	6.13	6.48	6.59
	5	7.52	--	--	6.26	--	7.01	6.97	6.94
	6	7.97	--	--	7.28	--	4.93	6.22	6.60
Weighted av.		8.69	7.44	7.46	6.67	6.79	6.96	6.40	7.20
None	1	8.67	7.24	7.74	7.06	5.80	6.73	6.10	7.05
	2	7.77	6.56	7.69	6.43	6.83	6.88	5.59	6.82
	3	6.99	6.53	6.97	5.85	6.33	6.38	5.55	6.37
	4	7.28	6.55	--	5.78	5.43	5.25	5.41	5.95
	5	7.02	--	--	5.60	--	4.67	5.83	5.78
	6	7.06	--	--	--	--	--	--	7.06
Weighted av.		7.90	6.76	7.46	6.40	6.25	6.29	5.57	6.66

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 3. AVERAGE WEIGHT PER BOLL OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF DEFICIENT SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-35, 1937-38, AND 1940

Fertilizer per acre, pounds	Week of blooming	Year						
		1933	1934	1935	1937	1938	1940	Av. all years
		Mean weight per boll in grams						
25,000 Manure	1	7.34	6.56	7.72	6.86	7.85	5.50	6.97
500 Superphosphate	2	6.35	6.39	7.60	6.58	7.27	5.86	6.68
	3	6.14	6.87	7.07	6.49	5.96	4.94	6.25
	4	6.18	6.97	6.62	6.63	5.24	5.18	6.14
	5	5.94	--	6.54	6.15	4.78	5.52	5.79
	6	--	--	--	--	5.83	6.00	5.92
Weighted av.[1]		6.56	6.52	7.40	6.56	6.50	5.20	6.46
1,000 Superphosphate	1	6.98	6.97	7.34	6.46	7.03	5.88	6.78
750 Nitrate of Soda	2	6.43	6.78	7.68	6.24	6.23	6.00	6.56
250 Muriate	3	5.64	6.40	6.73	6.21	5.86	5.17	6.00
	4	5.49	6.14	6.27	5.63	5.29	5.22	5.67
	5	--	--	7.60	--	4.33	5.55	5.83
	6	--	--	--	--	4.72	5.22	4.99
Weighted av.		6.51	6.73	7.08	6.15	5.47	5.30	6.21
1,000 Superphosphate	1	7.74	6.69	6.78	6.68	5.84	6.10	6.64
250 Muriate	2	7.05	6.37	7.30	6.28	5.12	5.49	6.27
	3	6.04	6.11	6.41	5.78	4.87	4.90	5.69
	4	6.03	5.64	5.95	4.98	4.77	5.29	5.44
	5	6.04	--	5.99	4.23	4.74	5.25	5.25
	6	--	--	--	--	4.37	3.50	3.94
Weighted av.		6.99	6.36	6.71	5.62	5.02	5.23	5.99
750 Nitrate of Soda	1	6.95	6.35	7.67	5.71	6.62	5.00	6.38
250 Muriate	2	6.67	6.73	7.62	6.35	6.46	5.02	6.48
	3	5.55	6.89	6.84	6.37	6.04	4.01	5.95
	4	5.33	7.28	6.73	5.95	5.45	4.58	5.89
	5	6.17	--	6.56	--	5.92	5.62	6.07
	6	--	--	--	--	5.53	7.25	6.39
Weighted av.		6.45	6.72	7.24	6.24	5.95	4.57	6.20
1,000 Superphosphate	1	7.56	6.71	7.59	6.76	6.75	5.20	6.76
750 Nitrate of Soda	2	7.19	6.46	7.16	6.70	6.29	6.02	6.64
	3	5.99	6.80	6.42	6.03	5.78	4.96	6.00
	4	6.16	7.05	6.14	5.97	5.83	5.50	6.11
	5	6.82	--	--	--	4.59	5.69	5.70
	6	--	--	--	--	--	6.00	6.00
Weighted av.		6.97	6.58	6.92	6.33	5.79	5.32	6.32
None	1	7.85	6.27	7.22	6.54	5.99	4.00	6.31
	2	6.85	5.85	7.06	6.03	5.84	4.84	6.08
	3	6.37	5.65	6.46	5.32	5.04	4.32	5.53
	4	5.79	6.63	5.90	4.53	4.88	4.60	5.39
	5	6.36	--	--	--	3.96	5.60	5.31
	6	--	--	--	--	2.15	5.80	3.98
Weighted av.		6.95	5.98	6.83	5.52	5.52	4.62	5.90

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 4. NUMBER OF SEED PER BOLL OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF ADEQUATE SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-38 AND 1940

Fertilizer per acre, pounds	Week of blooming	Year							
		1933	1934	1935	1936	1937	1938	1940	Av. all years
		Number of seed per boll							
25,000 Manure	1	34.4	35.2	34.6	34.4	31.4	34.4	32.7	33.9
500 Superphosphate	2	34.4	33.8	37.0	33.0	33.8	31.6	34.1	34.0
	3	34.6	34.1	36.2	35.8	33.0	28.9	30.3	33.3
	4	33.2	36.5	38.0	34.8	30.0	28.6	30.6	33.1
	5	32.4	--	40.7	34.7	31.1	27.9	32.3	33.2
	6	--	--	--	35.2	--	27.4	33.6	32.1
Weighted av.[1]		34.3	34.3	36.6	34.6	32.4	29.4	31.2	33.3
1,000 Superphosphate	1	35.3	34.6	36.5	32.0	30.4	32.3	30.5	33.1
750 Nitrate of Soda	2	35.8	32.8	36.4	32.2	32.6	29.6	30.5	32.8
250 Muriate	3	35.4	34.5	36.0	34.8	33.9	30.0	26.1	33.0
	4	36.0	34.3	36.9	35.8	33.0	28.9	29.0	33.4
	5	34.4	33.9	36.4	34.4	32.0	30.5	30.5	33.2
	6	36.5	--	--	34.5	--	27.2	31.8	32.5
Weighted av.		35.5	33.7	36.3	34.1	33.2	29.9	28.7	33.1
1,000 Superphosphate	1	33.0	32.4	33.5	31.9	30.5	32.9	32.2	32.3
250 Muriate	2	32.2	29.4	33.3	31.3	27.6	25.8	32.4	30.3
	3	31.7	28.5	32.8	32.5	29.6	24.0	27.7	29.5
	4	31.3	28.5	--	31.0	28.9	22.3	25.8	28.0
	5	28.4	--	--	32.7	29.9	25.0	26.7	28.5
	6	--	--	--	29.8	--	--	33.0	31.4
Weighted av.		32.2	30.1	33.2	31.7	28.8	25.0	28.0	29.9
750 Nitrate of Soda	1	33.8	30.5	30.5	30.1	29.3	26.3	24.8	29.3
250 Muriate	2	34.5	31.3	33.3	30.5	30.8	26.6	27.8	30.7
	3	34.9	33.3	34.6	33.9	30.2	26.2	24.1	31.0
	4	34.1	35.4	33.6	34.4	29.5	25.0	25.4	31.1
	5	33.2	--	34.7	33.6	31.1	26.3	26.9	31.0
	6	33.8	--	--	34.1	--	26.0	29.5	30.9
Weighted av.		34.2	32.1	33.2	32.6	30.2	26.1	25.5	30.6
1,000 Superphosphate	1	35.2	34.0	33.7	33.3	29.3	32.5	33.3	33.0
750 Nitrate of Soda	2	35.3	32.5	35.3	32.5	32.1	28.9	31.1	32.5
	3	36.0	33.8	35.3	34.4	32.8	28.8	31.4	33.2
	4	34.8	36.2	37.6	36.2	33.6	28.9	30.4	34.0
	5	33.0	--	--	35.1	--	31.1	32.1	32.8
	6	37.0	--	--	34.9	--	32.3	32.2	34.1
Weighted av.		35.2	33.4	35.3	33.7	32.7	29.6	31.1	33.0
None	1	34.2	32.3	33.0	29.9	27.7	27.0	32.9	31.0
	2	32.2	30.6	35.3	30.1	29.5	28.0	27.4	30.4
	3	32.4	32.4	34.7	31.2	29.1	26.9	27.2	30.6
	4	33.2	32.9	--	31.1	27.5	25.6	24.1	29.1
	5	33.0	--	--	30.9	--	23.9	31.7	29.9
	6	34.5	--	--	--	--	--	--	34.5
Weighted av.		33.1	31.5	34.6	30.4	28.8	26.9	27.0	30.3

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 5. NUMBER OF SEED PER BOLL OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF DEFICIENT SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-38 AND 1940

Fertilizer per acre, pounds	Week of blooming	Year						
		1933	1934	1935	1937	1938	1940	Av. all years
		Number of seed per boll						
25,000 Manure	1	33.5	33.5	34.5	32.2	34.0	34.0	33.6
500 Superphosphate	2	33.7	33.8	35.4	32.8	33.9	33.0	33.8
	3	31.6	34.6	36.5	35.4	30.2	26.9	32.5
	4	33.1	37.9	35.2	37.2	29.1	28.4	33.5
	5	32.3	--	34.3	35.0	28.3	33.1	32.6
	6	--	--	--	--	28.0	27.5	27.8
Weighted av.[1]		32.2	34.1	35.5	34.4	31.8	28.7	32.8
1,000 Superphosphate	1	33.8	32.8	33.6	31.8	30.6	29.1	32.0
750 Nitrate of soda	2	34.5	33.6	36.5	33.7	29.7	33.6	33.6
250 Muriate	3	31.2	33.6	36.7	35.0	29.8	29.4	32.6
	4	33.3	35.4	36.4	34.6	30.5	31.2	33.6
	5	--	--	38.2	--	28.1	31.1	32.5
	6	--	--	--	--	30.7	28.4	29.6
Weighted av.		33.9	33.5	36.2	34.3	29.6	30.6	33.0
1,000 Superphosphate	1	33.8	31.8	29.3	29.3	24.7	30.8	30.0
250 Muriate	2	32.8	30.0	33.4	28.9	24.5	30.4	30.0
	3	31.7	29.5	33.0	27.9	23.3	26.2	28.6
	4	31.3	31.5	33.6	27.4	25.7	28.8	29.7
	5	30.9	--	31.2	24.5	25.0	29.5	28.2
	6	--	--	--	--	22.3	21.0	21.7
Weighted av.		32.8	30.5	32.4	27.9	24.6	28.4	29.4
750 Nitrate of soda	1	30.7	31.0	33.4	28.5	29.3	27.5	30.1
250 Muriate	2	32.6	32.6	34.8	31.6	30.4	28.6	31.8
	3	31.6	33.9	35.6	33.5	30.5	22.9	31.3
	4	30.7	37.2	34.5	33.5	30.5	25.8	32.0
	5	31.8	--	34.7	--	28.6	31.1	31.6
	6	--	--	--	--	36.3	32.8	34.6
Weighted av.		31.9	32.8	34.7	32.3	30.2	25.7	31.3
1,000 Superphosphate	1	33.6	33.2	35.2	33.6	31.3	25.4	32.1
750 Nitrate of soda	2	34.2	33.4	36.4	34.3	32.7	30.3	33.6
	3	33.0	34.9	36.7	33.5	30.0	26.5	32.4
	4	32.1	38.1	35.2	34.9	30.2	30.4	33.5
	5	35.3	--	--	--	28.2	31.5	31.7
	6	--	--	--	--	--	30.0	30.0
Weighted av.		33.7	33.6	36.2	34.1	31.0	29.2	33.0
None	1	31.3	28.6	31.2	30.8	27.3	15.0	27.4
	2	30.6	28.6	32.8	30.3	26.4	26.4	29.2
	3	31.2	28.4	33.3	29.7	24.2	21.8	28.1
	4	30.1	32.9	33.2	28.2	26.7	24.9	29.3
	5	33.9	--	--	--	23.8	27.6	28.4
	6	--	--	--	--	16.0	28.6	22.3
Weighted av.		31.0	28.7	32.5	29.7	26.8	24.2	28.8

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 6. WEIGHT PER SEED OF COTTON RECEIVING DIFFERENT FERTILIZER TREATMENTS AND GROWN UNDER A CONDITION OF ADEQUATE SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-38 AND 1940

Fertilizer per acre, pounds	Week of blooming	Year							
		1933	1934	1935	1936	1937	1938	1940	Av. all years
		Weight per seed in milligrams							
25,000 Manure	1	15.8	15.1	15.7	16.8	15.3	17.0	14.4	15.7
500 Superphosphate	2	15.4	15.9	15.2	17.2	16.3	16.5	13.7	15.7
	3	14.5	15.7	14.6	14.7	15.4	15.1	14.4	14.9
	4	14.2	14.4	13.8	13.9	14.1	14.7	14.6	14.2
	5	14.3	--	14.6	14.1	14.1	13.7	14.1	14.2
	6	--	--	--	13.2	--	14.0	13.5	13.6
Weighted av.[1]		15.2	15.6	14.9	15.1	15.3	15.9	14.0	15.1
1,000 Superphosphate	1	16.4	14.7	15.6	16.0	13.1	15.3	14.1	15.0
750 Nitrate of Soda	2	15.8	15.7	14.5	16.2	15.5	15.9	12.8	15.2
250 Muriate	3	14.7	15.4	13.8	14.1	14.9	14.7	14.0	14.5
	4	14.2	13.6	13.2	13.1	13.7	16.7	14.8	14.2
	5	15.0	14.4	13.0	13.5	12.7	13.6	14.2	13.8
	6	13.9	--	--	14.1	--	13.1	12.9	13.5
Weighted av.		15.5	15.2	14.0	14.5	14.4	15.2	13.7	14.6
1,000 Superphosphate	1	15.0	13.7	14.9	14.3	15.0	15.6	10.1	14.1
250 Muriate	2	14.3	13.7	13.5	14.1	14.2	14.7	11.6	13.7
	3	13.6	14.0	12.2	12.3	13.0	13.0	12.9	13.0
	4	13.2	13.0	--	12.4	12.4	13.0	13.6	12.9
	5	14.6	--	--	13.7	10.3	14.1	12.5	13.0
	6	--	--	--	14.0	--	--	13.6	13.8
Weighted av.		14.3	13.7	13.4	13.4	13.4	13.8	12.4	13.5
750 Nitrate of Soda	1	16.2	14.3	15.5	16.5	12.1	16.0	11.9	14.6
250 Muriate	2	16.0	15.3	15.4	16.2	14.2	15.9	11.8	15.0
	3	14.6	15.0	13.9	13.6	14.2	11.4	12.9	13.7
	4	13.9	14.0	14.3	12.7	13.0	13.4	14.1	13.6
	5	14.8	--	15.1	13.0	13.0	14.9	13.2	14.0
	6	13.1	--	--	12.8	--	12.7	13.8	13.1
Weighted av.		15.4	14.9	14.8	14.3	13.8	14.6	13.0	14.4
1,000 Superphosphate	1	16.8	14.9	15.4	15.2	12.4	15.7	15.1	15.1
750 Nitrate of Soda	2	16.2	14.9	14.2	13.5	14.1	16.0	12.5	14.5
	3	14.7	14.5	12.9	11.6	13.3	15.2	13.9	13.7
	4	14.4	12.9	11.8	9.9	11.4	13.7	14.8	12.7
	5	15.4	--	--	11.5	--	14.3	13.9	13.8
	6	14.7	--	--	13.6	--	9.1	12.1	12.4
Weighted av.		15.8	14.7	13.7	12.8	12.9	14.9	13.6	14.1
None	1	15.6	13.7	15.2	14.8	12.3	15.7	12.6	14.3
	2	15.0	13.5	13.7	13.7	14.0	15.6	11.9	13.9
	3	13.2	13.2	12.4	11.2	13.1	15.0	12.7	13.0
	4	13.6	12.5	--	11.0	11.5	12.5	13.1	12.4
	5	13.8	--	--	11.5	--	11.7	11.9	12.2
	6	13.4	--	--	--	--	--	--	13.4
Weighted av.		14.8	13.5	13.6	13.1	13.0	14.7	12.5	13.6

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 7. WEIGHT PER SEED OF COTTON RECEIVING DIFFERENT FERTILIZER TREATMENTS AND GROWN UNDER A CONDITION OF DEFICIENT SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-35, 1937-38, AND 1940

Fertilizer per acre, pounds	Week of blooming	Year						Av. all years
		1933	1934	1935	1937	1938	1940	
		Weight per seed in milligrams						
25,000 Manure	1	14.3	12.6	14.5	13.9	15.3	10.2	13.5
500 Superphosphate	2	12.4	12.0	13.9	12.6	14.3	12.0	12.9
	3	12.0	12.8	12.2	11.2	13.2	10.1	11.9
	4	11.5	11.9	11.4	10.8	11.8	11.6	11.5
	5	11.6	--	12.0	10.9	11.0	11.2	11.3
	6	--	--	--	--	13.7	15.7	14.7
Weighted av.[1]		12.8	12.2	13.4	11.8	13.6	11.6	12.6
1,000 Superphosphate	1	13.4	13.4	14.5	12.7	15.3	12.5	13.6
750 Nitrate of soda	2	12.3	12.7	13.9	11.5	14.4	10.0	12.5
250 Muriate	3	11.3	12.3	11.6	10.7	13.3	11.1	11.7
	4	9.9	11.1	10.9	9.6	11.6	10.7	10.6
	5	--	--	13.0	--	10.2	11.4	11.5
	6	--	--	--	--	10.1	11.8	11.0
Weighted av.		12.5	12.7	12.7	10.9	12.4	11.3	12.1
1,000 Superphosphate	1	14.3	12.8	14.5	13.8	14.9	11.1	13.6
250 Muriate	2	13.9	13.4	13.6	13.4	13.7	10.8	13.1
	3	11.9	13.2	12.0	12.5	12.6	11.4	12.3
	4	11.8	11.5	10.8	10.6	11.3	11.3	11.2
	5	11.9	--	11.9	10.0	11.1	11.8	11.3
	6	--	--	--	--	10.6	11.0	10.8
Weighted av.		13.5	13.0	12.9	12.1	12.7	11.3	12.6
750 Nitrate of soda	1	14.6	12.9	14.6	12.3	14.5	11.0	13.3
250 Muriate	2	13.3	13.0	14.1	12.3	13.9	10.9	12.9
	3	11.1	12.9	12.0	11.3	12.6	11.1	11.8
	4	10.8	12.7	12.1	10.4	11.6	11.4	11.5
	5	10.9	--	11.8	--	10.2	11.9	11.2
	6	--	--	--	--	8.8	13.9	11.4
Weighted av.		13.0	12.9	13.2	11.6	12.7	11.5	12.5
1,000 Superphosphate	1	14.4	12.9	14.2	12.5	14.3	13.0	13.6
750 Nitrate of soda	2	13.9	12.3	13.2	12.4	12.6	12.6	12.8
	3	11.4	12.9	11.3	11.0	12.8	12.3	12.0
	4	11.3	12.0	11.2	10.1	11.6	11.7	11.3
	5	11.8	--	--	--	10.6	12.0	11.5
	6	--	--	--	--	--	13.3	13.3
Weighted av.		13.4	12.5	12.6	11.5	12.3	12.3	12.4
None	1	15.4	13.1	14.2	12.5	13.4	13.3	13.7
	2	14.0	12.8	13.5	11.8	13.9	10.6	12.8
	3	12.7	12.9	12.2	10.6	12.6	11.9	12.2
	4	12.2	12.9	11.0	9.5	11.7	11.6	11.5
	5	12.0	--	--	--	10.5	13.4	12.0
	6	--	--	--	--	6.9	12.8	9.9
Weighted av.		13.9	12.9	13.1	11.0	12.7	11.9	12.6

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 8. WEIGHT OF LINT PER SEED OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF ADEQUATE SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-38 AND 1940

Fertilizer per acre, pounds	Week of blooming	Year							
		1933	1934	1935	1936	1937	1938	1940	Av. all years
		Weight of lint per seed in milligrams							
25,000 Manure	1	9.5	8.3	8.2	8.3	8.4	8.9	8.7	8.6
500 Superphosphate	2	9.3	8.0	7.9	8.4	8.5	7.9	7.2	8.2
	3	8.8	7.6	7.8	8.1	8.4	7.9	7.3	8.0
	4	8.2	7.5	7.0	7.6	8.3	7.8	6.8	7.6
	5	7.8	--	6.7	7.5	7.9	7.1	6.7	7.3
	6	--	--	--	7.1	--	6.9	6.9	7.0
Weighted av.[1]		9.1	7.9	7.8	8.0	8.3	7.8	7.0	8.0
1,000 Superphosphate	1	9.3	8.2	7.4	8.6	7.6	8.2	6.6	8.0
750 Nitrate of Soda	2	9.0	8.0	7.4	8.3	8.6	7.9	6.9	8.0
250 Muriate	3	8.3	7.4	7.3	8.1	8.6	7.9	8.1	8.0
	4	7.9	7.4	6.4	7.3	8.0	7.4	7.1	7.4
	5	7.4	7.5	6.4	7.1	7.3	6.2	6.4	6.9
	6	7.2	--	--	7.4	--	7.6	6.1	7.1
Weighted av.		8.7	7.8	7.1	7.8	8.3	7.7	7.2	7.8
1,000 Superphosphate	1	9.7	8.3	8.7	8.3	9.6	9.1	7.8	8.8
250 Muriate	2	8.9	7.9	8.5	8.1	8.9	8.6	7.5	8.3
	3	8.9	7.5	7.9	7.6	8.7	8.4	7.5	8.1
	4	8.3	7.1	--	7.9	8.5	8.4	7.3	7.9
	5	7.9	--	--	8.4	7.0	10.6	6.8	8.1
	6	--	--	--	7.5	--	--	6.1	6.8
Weighted av.		9.1	7.9	8.3	8.0	8.7	8.5	7.4	8.3
750 Nitrate of Soda	1	9.6	8.5	9.0	9.0	8.7	9.9	6.1	8.7
250 Muriate	2	9.3	8.2	8.6	8.7	9.0	8.7	8.2	8.7
	3	8.5	7.5	7.7	7.9	8.8	8.6	7.7	8.1
	4	7.9	7.6	7.4	7.3	8.2	7.8	7.6	7.7
	5	7.6	--	7.3	7.2	7.9	8.5	7.8	7.7
	6	6.7	--	--	6.9	--	7.7	9.3	7.7
Weighted av.		8.8	8.0	8.1	8.0	8.7	8.5	7.8	8.3
1,000 Superphosphate	1	9.6	8.4	8.3	7.7	8.7	8.9	8.3	8.6
750 Nitrate of Soda	2	9.2	7.7	7.6	7.1	8.5	8.9	6.6	7.9
	3	8.2	6.9	7.4	6.7	7.9	8.7	5.9	7.4
	4	7.9	6.7	6.0	5.9	7.2	8.3	6.5	6.9
	5	7.3	--	--	6.4	--	8.2	7.7	7.4
	6	6.9	--	--	7.3	--	5.4	7.2	6.7
Weighted av.		8.9	7.6	7.5	7.0	7.9	8.6	6.5	7.7
None	1	9.7	8.7	8.2	8.8	8.6	9.3	6.4	8.5
	2	9.2	7.9	8.1	7.7	9.1	9.0	8.3	8.5
	3	8.4	6.9	7.7	7.6	8.6	8.7	7.7	7.9
	4	8.3	7.5	--	7.6	8.3	7.9	9.4	8.2
	5	7.4	--	--	6.5	--	7.9	6.8	7.2
	6	7.0	--	--	--	--	--	--	7.0
Weighted av.		9.1	8.0	8.0	7.9	8.7	8.7	8.1	8.4

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 9. WEIGHT OF LINT PER SEED OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF DEFICIENT SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-35, 1937-38, AND 1940

Fertilizer per acre, pounds	Week of blooming	Year						
		1933	1934	1935	1937	1938	1940	Av. all years
		Weight of lint per seed in milligrams						
25,000 Manure	1	7.7	7.0	7.9	7.4	7.8	5.9	7.3
500 Superphosphate	2	6.4	6.9	7.6	7.4	7.0	6.4	7.0
	3	7.5	7.0	7.2	7.2	6.5	6.8	7.0
	4	7.2	6.4	7.4	7.0	6.2	6.5	6.8
	5	6.8	--	7.1	6.7	5.9	5.6	6.4
	6	--	--	--	--	7.1	5.5	6.3
Weighted av.[1]		7.0	6.9	7.5	7.3	6.8	6.6	7.0
1,000 Superphosphate	1	7.2	7.9	7.4	7.6	8.0	7.3	7.6
750 Nitrate of soda	2	6.4	7.4	7.1	7.1	6.9	6.7	6.9
250 Muriate	3	6.8	6.8	6.7	7.0	6.4	6.6	6.7
	4	6.6	6.2	6.4	6.7	5.7	6.1	6.3
	5	--	--	6.9	--	5.3	6.7	6.3
	6	--	--	--	--	5.2	6.3	5.8
Weighted av.		6.7	7.4	6.9	7.0	6.1	6.4	6.8
1,000 Superphosphate	1	8.6	8.2	8.7	8.9	8.8	8.4	8.6
250 Muriate	2	7.6	7.9	8.2	8.3	7.2	7.2	7.7
	3	7.2	7.5	7.4	8.2	8.3	7.1	7.5
	4	7.5	6.4	6.9	7.5	7.3	7.0	7.1
	5	7.6	--	7.3	7.3	7.7	6.5	7.3
	6	--	--	--	--	9.0	6.0	7.5
Weighted av.		7.8	7.8	7.8	8.0	7.7	7.0	7.7
750 Nitrate of soda	1	8.1	7.6	8.4	7.7	8.0	7.3	7.9
250 Muriate	2	7.2	7.6	7.8	7.8	7.4	6.8	7.4
	3	6.5	7.5	7.3	7.7	7.2	6.5	7.1
	4	6.5	6.9	7.4	7.3	6.3	6.3	6.8
	5	7.5	--	7.1	--	6.0	6.4	6.8
	6	--	--	--	--	5.9	7.6	6.8
Weighted av.		7.2	7.5	7.7	7.7	7.0	6.5	7.3
1,000 Superphosphate	1	8.1	7.4	7.3	7.6	7.3	7.9	7.6
750 Nitrate of soda	2	7.1	7.0	6.5	7.1	6.6	6.9	6.9
	3	6.7	6.6	6.2	7.0	6.4	6.5	6.6
	4	7.9	6.5	6.3	7.0	6.0	6.3	6.7
	5	7.5	--	--	--	5.7	6.5	6.6
	6	--	--	--	--	--	6.7	6.7
Weighted av.		7.3	7.1	6.5	7.1	6.4	6.5	6.8
None	1	9.7	8.8	8.9	8.8	8.5	13.3	9.7
	2	8.4	7.7	8.1	8.1	8.2	7.7	8.0
	3	7.7	7.0	7.2	7.3	8.2	7.9	7.6
	4	7.0	7.3	6.8	6.6	7.3	6.9	7.0
	5	6.7	--	--	--	6.1	7.2	6.7
	6	--	--	--	--	6.6	7.7	7.2
Weighted av.		8.5	7.9	7.9	7.5	7.9	7.4	7.9

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 10. PERCENTAGE OF LINT OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF ADEQUATE SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-38 AND 1940

Fertilizer per acre, pounds	Week of blooming	Year							
		1933	1934	1935	1936	1937	1938	1940	Av. all years
		Per cent lint							
25,000 Manure	1	37.3	35.4	34.2	33.0	35.4	34.3	37.8	35.3
500 Superphosphate	2	37.6	33.5	34.3	32.8	34.3	32.5	34.6	34.2
	3	37.7	32.5	34.6	35.5	35.1	33.1	34.0	34.6
	4	36.6	34.2	33.7	35.3	36.9	34.6	31.7	34.7
	5	35.2	--	31.6	34.7	35.9	34.3	31.9	33.9
	6	--	--	--	35.2	--	35.6	33.3	34.7
Weighted av.[1]		37.4	33.6	34.3	34.6	35.3	34.3	32.9	34.6
1,000 Superphosphate	1	36.2	35.6	32.1	35.0	36.7	34.7	30.8	34.4
750 Nitrate of Soda	2	36.3	33.8	33.7	33.9	35.7	33.4	34.4	34.5
250 Muriate	3	35.9	32.5	34.5	36.3	36.5	34.8	34.8	35.0
	4	35.8	35.1	32.5	35.6	36.9	32.1	32.7	34.4
	5	33.0	34.2	33.0	34.5	36.7	33.5	31.1	33.7
	6	34.1	--	--	34.3	--	37.2	31.0	34.2
Weighted av.		35.8	33.9	33.8	35.1	36.5	33.8	33.0	34.6
1,000 Superphosphate	1	39.2	38.0	36.8	36.6	39.0	37.1	42.8	38.5
250 Muriate	2	38.4	36.4	38.6	36.3	38.5	37.1	39.0	37.8
	3	39.7	35.0	39.4	38.3	40.0	39.1	36.5	38.3
	4	38.8	35.3	--	38.9	40.6	41.0	34.9	38.3
	5	35.0	--	--	37.9	40.4	43.0	35.0	38.3
	6	--	--	--	34.9	--	--	28.6	31.8
Weighted av.		38.8	36.6	38.3	37.1	39.4	38.3	36.6	37.9
750 Nitrate of Soda	1	37.2	37.3	36.8	35.2	41.8	38.0	35.3	37.4
250 Muriate	2	36.6	35.0	35.9	34.9	38.7	35.5	40.8	36.8
	3	36.9	33.4	35.6	36.7	38.3	37.8	37.3	36.6
	4	36.2	35.2	34.1	36.6	38.8	36.9	34.7	36.1
	5	34.1	--	32.5	35.8	37.9	36.3	36.7	35.5
	6	33.7	--	--	34.9	--	39.0	40.7	37.1
Weighted av.		36.5	35.0	35.5	35.8	38.6	36.9	37.2	36.5
1,000 Superphosphate	1	36.4	36.2	34.9	33.7	41.2	36.3	35.5	36.3
750 Nitrate of Soda	2	36.3	34.1	34.8	34.6	37.6	36.0	34.1	35.4
	3	35.9	32.3	36.4	36.7	37.4	36.5	30.0	35.0
	4	35.4	34.3	33.6	37.5	38.7	37.7	30.6	35.4
	5	32.2	--	--	35.6	--	36.4	35.2	34.9
	6	31.9	--	--	34.7	--	36.7	37.5	35.2
Weighted av.		35.9	34.2	35.3	35.2	37.9	36.6	31.6	35.2
None	1	38.3	38.7	35.0	37.1	41.0	37.3	34.4	37.4
	2	38.0	37.1	36.9	35.9	39.4	36.6	40.5	37.8
	3	38.8	34.3	38.5	40.7	39.6	36.0	37.5	37.9
	4	38.0	37.4	--	41.0	42.0	39.1	41.7	39.9
	5	34.9	--	--	36.2	--	40.3	37.1	37.1
	6	34.3	--	--	--	--	--	--	34.3
Weighted av.		38.1	37.3	37.0	37.8	40.0	36.9	39.1	38.0

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 11. PERCENTAGE OF LINT OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF DEFICIENT SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-35, 1937-38, AND 1940

Fertilizer per acre, pounds	Week of blooming	Year						
		1933	1934	1935	1937	1938	1940	Av. all years
		Per cent lint						
25,000 Manure	1	35.0	35.7	35.2	34.5	33.7	36.4	35.1
500 Superphosphate	2	34.0	36.5	35.3	37.1	32.6	30.0	34.3
	3	38.4	35.4	36.9	39.1	33.0	37.1	36.7
	4	38.5	35.0	39.3	39.4	34.4	36.0	37.1
	5	36.8	--	37.0	37.9	34.9	33.6	36.0
	6	--	--	--	--	34.2	25.0	29.6
Weighted av.[1]		35.4	36.1	35.9	38.1	33.3	36.2	35.8
1,000 Superphosphate	1	34.9	37.1	33.8	37.3	34.3	36.2	35.6
750 Nitrate of soda	2	34.1	36.9	33.7	38.1	31.8	37.4	35.3
250 Muriate	3	37.4	35.5	36.7	39.5	32.8	37.4	36.6
	4	40.0	36.0	37.0	40.8	33.1	36.5	37.2
	5	--	--	34.6	--	34.0	37.7	35.4
	6	--	--	--	--	33.7	34.0	33.9
Weighted av.		34.7	36.7	35.2	39.1	33.0	37.0	36.0
1,000 Superphosphate	1	37.5	39.2	37.5	39.2	37.2	42.6	38.9
250 Muriate	2	35.2	37.1	37.7	38.2	33.4	40.0	36.9
	3	37.6	36.0	38.1	39.8	40.0	38.1	38.3
	4	39.0	35.5	39.0	41.3	39.1	38.0	38.7
	5	39.1	--	38.2	42.5	40.4	36.8	39.4
	6	--	--	--	--	45.9	35.7	40.8
Weighted av.		36.6	37.4	37.9	39.9	37.5	38.3	38.0
750 Nitrate of soda	1	35.7	37.1	36.6	38.3	35.7	40.0	37.2
250 Muriate	2	35.1	36.8	35.4	38.9	34.7	38.7	36.6
	3	36.9	36.7	37.7	40.5	36.5	37.2	37.6
	4	37.5	35.3	38.0	41.3	35.2	35.6	37.2
	5	38.7	--	37.5	--	36.1	35.6	37.0
	6	--	--	--	--	40.0	34.5	37.3
Weighted av.		36.7	36.7	36.7	39.8	35.5	36.6	37.0
1,000 Superphosphate	1	35.8	36.4	34.0	37.9	33.9	38.5	36.1
750 Nitrate of soda	2	33.8	36.4	33.0	36.7	34.7	34.6	34.9
	3	37.1	33.8	35.5	38.8	33.4	35.0	35.6
	4	41.2	35.0	36.0	41.0	34.1	35.1	37.1
	5	39.0	--	--	--	35.1	36.1	36.7
	6	--	--	--	--	--	33.3	33.3
Weighted av.		35.3	36.2	34.1	38.3	34.3	35.1	35.6
None	1	38.7	40.2	38.6	41.3	38.9	50.0	41.3
	2	37.4	37.6	37.4	40.5	37.3	41.9	38.7
	3	37.8	35.2	37.3	40.8	40.0	40.1	38.5
	4	36.6	36.0	38.0	40.8	38.5	37.1	37.8
	5	35.8	--	--	--	36.9	35.7	36.1
	6	--	--	--	--	49.3	37.9	43.6
Weighted av.		37.8	37.9	37.8	40.7	40.2	39.1	38.9

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 12. PERCENTAGE OF OIL IN SEED OF COTTON RECEIVING DIFFERENT FERTILIZER APPLICATIONS AND GROWN UNDER A CONDITION OF ADEQUATE SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-38, AND 1940

Fertilizer per acre, pounds	Week of blooming	Year							
		1933	1934	1935	1936	1937	1938	1940	Av. all years
		Per cent oil in seed							
25,000 Manure	1	25.8	24.3	23.9	25.5	25.1	23.6	26.4	24.9
500 Superphosphate	2	26.7	25.3	24.1	25.3	26.4	23.3	26.2	25.3
	3	26.7	25.4	23.9	25.0	25.9	22.6	25.7	25.0
	4	26.4	23.8	24.6	24.3	26.2	23.0	26.0	24.9
	5	26.7	--	25.7	24.1	26.4	23.8	25.3	25.3
	6	--	--	--	24.1	--	20.7	25.1	23.3
Weighted av.[1]		26.4	25.0	24.1	24.8	26.1	23.1	25.8	25.0
1,000 Superphosphate	1	23.2	25.2	22.9	24.2	24.0	24.1	26.7	24.3
750 Nitrate of Soda	2	24.0	25.5	23.0	24.6	24.9	22.8	25.9	24.4
250 Muriate	3	24.2	26.5	23.5	23.9	25.0	23.4	25.4	24.6
	4	24.3	26.3	23.4	24.1	25.1	23.9	26.3	24.8
	5	24.1	22.9	24.2	23.5	24.3	24.2	25.3	24.1
	6	24.0	--	--	24.4	--	23.7	25.5	24.4
Weighted av.		23.9	25.7	23.3	24.1	24.9	23.5	25.9	24.5
1,000 Superphosphate	1	26.4	25.8	24.7	27.1	27.1	25.1	--	26.0
250 Muriate	2	26.0	26.2	24.0	27.5	25.1	23.6	28.2	25.8
	3	26.1	25.6	24.3	25.8	25.0	22.1	28.4	25.3
	4	25.8	23.6	24.4	26.4	23.0	22.4	27.4	24.7
	5	26.2	25.0	--	24.8	24.7	--	26.8	25.5
	6	--	--	--	--	--	--	--	--
Weighted av.		26.1	25.9	24.3	26.8	24.8	23.0	27.9	25.5
750 Nitrate of Soda	1	22.9	20.6	21.4	24.1	21.9	20.6	--	21.9
250 Muriate	2	23.1	21.1	21.7	24.0	23.4	21.4	23.6	22.6
	3	23.3	21.5	21.5	23.0	22.7	21.4	24.7	22.6
	4	23.3	22.2	21.6	23.8	23.4	19.6	23.0	22.4
	5	23.0	--	22.6	23.6	22.8	19.4	23.9	22.6
	6	23.9	--	--	23.8	--	--	--	23.9
Weighted av.		23.1	21.2	21.6	23.7	23.0	20.6	23.8	22.4
1,000 Superphosphate	1	22.8	22.0	19.6	22.5	23.0	20.3	25.4	22.2
750 Nitrate of Soda	2	23.5	21.2	19.9	20.8	22.2	19.8	24.7	21.7
	3	23.8	21.1	20.2	19.4	21.4	20.1	23.6	21.4
	4	23.6	21.2	20.9	19.5	19.8	20.2	24.1	21.3
	5	23.1	22.2	21.7	19.1	--	19.8	24.7	21.8
	6	23.9	--	--	22.3	--	--	21.7	22.6
Weighted av.		23.4	21.4	20.1	20.6	21.4	20.0	24.0	21.6
None	1	25.0	23.2	23.2	25.6	23.0	23.1	25.3	24.1
	2	24.6	23.3	23.3	23.6	24.0	20.3	25.6	23.5
	3	24.5	23.6	23.6	21.5	22.9	19.4	25.7	23.0
	4	25.0	22.2	23.9	22.3	21.5	21.6	25.6	23.2
	5	26.0	--	--	23.0	--	--	--	24.5
	6	--	--	--	--	--	--	--	--
Weighted av.		24.8	23.2	23.4	23.6	22.9	20.7	25.6	23.5

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 13. PERCENTAGE OF OIL IN SEED OF COTTON RECEIVING DIFFERENT FERTILIZER TREATMENTS AND GROWN UNDER A CONDITION OF DEFICIENT SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-35, 1937-38, AND 1940

Fertilizer per acre, pounds	Week of blooming	Year						
		1933	1934	1935	1937	1938	1940	Av. all years
		Per cent oil in seed						
25,000 Manure	1	19.0	19.7	21.1	18.7	20.9	22.3	20.3
500 Superphosphate	2	17.9	21.6	21.4	18.8	19.6	23.4	20.5
	3	20.1	23.9	22.1	20.9	20.3	23.4	21.8
	4	21.5	24.6	24.1	21.3	20.9	24.2	22.8
	5	22.3	--	24.6	--	21.6	24.0	23.1
	6	22.8	--	--	--	--	25.3	24.1
Weighted av.[1]		19.0	21.5	21.7	20.0	20.3	23.7	21.0
1,000 Superphosphate	1	19.9	20.5	19.8	19.9	18.9	23.5	20.4
750 Nitrate of soda	2	19.2	21.1	20.3	18.9	18.0	23.1	20.1
250 Muriate	3	20.1	22.8	21.2	21.2	17.9	23.6	21.1
	4	21.7	23.6	22.0	21.4	19.8	24.4	22.2
	5	--	--	24.0	--	18.2	24.5	22.2
	6	--	--	--	--	19.3	24.6	22.0
Weighted av.		19.5	21.3	20.9	20.4	18.6	23.9	20.8
1,000 Superphosphate	1	22.9	21.7	23.8	25.3	24.0	27.3	24.2
250 Muriate	2	22.6	22.5	24.3	25.3	23.3	26.5	24.1
	3	23.0	22.7	24.4	25.9	21.5	25.4	23.8
	4	23.9	23.5	24.7	25.4	21.6	25.6	24.1
	5	25.2	26.6	24.7	25.5	21.4	25.9	24.9
	6	--	--	--	--	--	--	--
Weighted av.		22.9	22.4	24.3	25.6	22.4	25.8	23.9
750 Nitrate of soda	1	18.6	19.5	20.9	18.9	19.5	--	19.5
250 Muriate	2	18.6	20.5	20.4	20.3	18.8	23.0	20.3
	3	18.8	22.3	21.4	21.6	19.2	21.9	20.9
	4	20.5	22.4	22.8	22.0	18.1	24.2	21.7
	5	22.6	23.3	23.6	--	20.5	23.8	22.8
	6	--	--	--	--	--	26.9	26.9
Weighted av.		18.7	20.8	21.2	20.9	19.0	23.3	20.7
1,000 Superphosphate	1	18.0	19.3	19.9	20.3	16.9	--	18.9
750 Nitrate of soda	2	17.8	20.6	19.0	18.6	16.9	22.7	19.3
	3	18.6	22.7	19.7	21.4	17.2	22.8	20.4
	4	19.2	23.1	21.4	21.6	18.2	23.8	21.2
	5	--	--	21.4	--	18.3	23.8	21.2
	6	--	--	--	--	--	26.3	26.3
Weighted av.		18.1	20.5	19.6	20.3	17.4	23.4	20.0
None	1	21.7	22.0	22.6	23.4	22.7	--	22.5
	2	21.5	21.2	22.4	20.6	21.2	26.0	22.2
	3	21.7	23.3	22.8	20.7	21.1	24.4	22.3
	4	21.6	23.8	23.1	20.3	21.1	25.3	22.5
	5	22.1	--	--	--	19.0	25.6	22.2
	6	--	--	--	--	--	--	--
Weighted av.		21.6	22.0	22.6	20.8	21.2	25.1	22.2

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 14. PERCENTAGE OF PROTEIN[1] IN SEED OF COTTON RECEIVING DIFFERENT FERTILIZER TREATMENTS AND GROWN UNDER A CONDITION OF VARYING SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1936-38 AND 1940

Fertilizer per acre, pounds	Week of blooming	Adequate soil moisture					Deficient soil moisture			
		Year					Year			
		1936	1937	1938	1940	Av. all years	1937	1938	1940	Av. all years
		Per cent of protein in seed								
25,000 Manure	1	28.2	32.0	30.2	29.6	30.0	32.1	32.6	33.8	32.8
500 Super-	2	30.7	30.7	30.5	29.8	30.4	32.9	31.3	32.0	32.1
phosphate	3	31.7	30.2	30.6	30.0	30.6	33.9	32.9	32.0	32.9
	4	30.8	30.2	30.3	30.7	30.5	33.5	32.0	34.1	33.2
	5	29.9	30.4	30.2	31.2	30.4	--	33.0	32.1	32.6
	6	31.9	--	28.2	30.7	30.2	--	--	33.4	33.4
Weighted av.[2]		30.9	30.4	30.3	30.5	30.5	33.4	32.1	33.0	32.8
1,000 Super-	1	29.2	30.7	33.6	31.2	31.3	32.2	32.6	32.3	32.4
phosphate	2	30.0	30.4	33.4	31.8	31.4	31.7	30.6	32.7	31.7
750 Nitrate of	3	30.2	29.3	32.1	31.9	30.9	34.6	31.4	32.6	32.9
soda	4	31.1	28.8	31.1	31.8	30.7	32.7	31.8	33.3	32.6
250 Muriate	5	30.6	28.7	30.0	31.3	30.1	--	31.9	33.1	32.5
	6	30.6	--	30.0	33.2	31.3	--	32.7	34.6	33.7
Weighted av.		30.3	29.3	32.0	31.8	30.9	33.2	31.6	33.0	32.6
1,000 Super-	1	25.5	26.7	27.4	--	26.5	28.5	27.4	29.6	28.5
phosphate	2	25.9	27.0	26.8	29.0	27.2	29.3	28.8	28.1	28.7
250 Muriate	3	28.7	27.2	25.8	28.6	27.6	28.5	28.4	27.3	28.1
	4	30.6	29.4	26.8	28.4	28.8	28.8	27.6	28.1	28.2
	5	31.0	27.0	--	29.9	29.3	28.5	27.0	28.6	28.0
	6	--	--	--	--	--	--	--	--	--
Weighted av.		27.3	27.4	26.9	28.7	27.5	28.8	28.0	28.0	28.3
750 Nitrate of	1	32.5	32.3	33.1	31.0	32.2	31.4	32.7	--	32.1
soda	2	31.6	32.6	31.8	32.8	32.2	33.5	32.1	30.9	32.2
250 Muriate	3	31.6	32.1	31.8	32.5	32.1	34.2	32.5	32.0	32.9
	4	32.1	31.2	30.7	32.3	31.6	33.5	32.2	32.9	32.9
	5	31.8	33.0	29.9	--	31.7	--	32.7	33.9	33.3
	6	31.6	--	--	--	--	--	--	34.2	34.2
Weighted av.		31.8	32.1	31.1	32.2	31.8	33.5	32.3	32.5	32.8
1,000 Super-	1	31.4	32.3	31.4	32.6	31.9	32.4	31.3	--	31.9
phosphate	2	30.0	33.4	31.0	31.3	31.5	32.3	30.7	31.6	31.5
750 Nitrate of	3	30.7	32.3	30.4	32.2	31.4	34.1	31.1	33.3	32.8
soda	4	31.8	31.9	30.0	32.1	31.5	34.1	31.8	33.7	33.2
	5	31.5	--	28.1	31.7	30.5	--	--	34.0	34.0
	6	30.9	--	--	--	--	--	--	34.5	34.5
Weighted av.		30.7	32.6	30.4	31.8	31.3	33.2	31.2	33.5	32.6
None	1	27.7	27.8	26.8	27.3	27.4	28.5	30.0	--	29.2
	2	28.0	27.8	28.0	28.6	28.1	29.3	30.3	30.4	30.0
	3	29.9	28.0	26.7	29.7	28.6	29.6	30.7	29.4	29.9
	4	29.9	26.6	27.6	30.4	28.6	29.5	29.7	31.5	30.2
	5	31.2	--	--	--	--	--	27.5	31.5	29.5
Weighted av.		28.7	27.6	27.4	29.4	28.3	29.4	29.9	30.4	29.9

[1] The percentage of protein is on the basis of oil-free seed.
[2] Weighted on basis of number of bolls occurring in each period.

TABLE 15. PERCENTAGE OF FUZZ ON SEED OF COTTON RECEIVING DIFFERENT FERTILIZER TREATMENTS AND GROWN UNDER A CONDITION OF VARYING SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1936-38 AND 1940

Fertilizer per acre, pounds	Week of blooming	Adequate soil moisture					Deficient soil moisture			
		Year					Year			
		1936	1937	1938	1940	Av. all years	1937	1938	1940	Av. all years
		Per cent fuzz on seed								
25,000 Manure	1	13.8	11.3	19.1	14.6	14.7	16.2	17.6	16.4	16.7
500 Super-	2	16.6	14.2	20.2	14.9	16.5	19.6	19.2	15.5	18.1
phosphate	3	13.0	13.5	19.5	14.9	15.2	16.0	20.8	15.4	17.4
	4	8.4	13.1	17.2	18.7	14.4	13.6	16.4	16.9	15.6
	5	11.9	11.9	18.2	18.4	15.1	14.7	15.5	16.3	15.5
	6	12.0	--	24.5	17.0	17.8	--	19.4	16.8	18.1
Weighted av.[1]		12.7	13.4	18.8	16.8	15.4	17.1	18.6	16.0	17.2
1,000 Super-	1	12.8	9.7	18.5	13.2	13.6	15.6	19.1	15.7	16.8
phosphate	2	16.7	12.2	20.1	13.2	15.6	16.3	19.6	15.5	17.1
750 Nitrate of	3	15.3	12.7	21.8	15.8	16.4	12.3	20.2	15.1	15.9
soda	4	10.8	11.7	20.6	18.0	15.3	10.2	17.4	14.9	14.2
250 Muriate	5	13.3	11.3	18.0	17.1	14.9	--	17.0	15.6	16.3
	6	15.7	--	25.0	14.1	18.3	--	14.7	13.5	14.1
Weighted av.		14.4	12.1	20.2	16.7	15.9	13.5	18.4	15.1	15.7
1,000 Super-	1	15.1	16.9	17.6	13.3	15.7	17.5	19.0	16.1	17.5
phosphate	2	16.9	19.4	18.3	13.0	16.9	20.3	20.2	15.4	18.6
250 Muriate	3	15.5	18.6	19.6	13.1	16.7	17.6	20.4	16.8	18.3
	4	10.8	15.5	16.5	17.5	15.1	14.9	17.5	18.7	17.0
	5	16.5	19.2	17.9	16.8	17.6	13.6	20.4	18.3	17.4
	6	17.0	--	--	16.0	16.5	--	18.8	17.3	18.1
Weighted av.		15.4	18.3	18.3	15.0	16.8	17.2	19.5	17.5	18.1
750 Nitrate of	1	12.7	6.9	21.0	17.4	14.5	9.4	17.0	15.0	13.8
soda	2	17.1	10.7	20.8	15.0	15.9	13.3	17.6	16.4	15.8
250 Muriate	3	13.2	11.4	23.2	15.7	15.9	10.3	17.3	17.0	14.9
	4	9.5	8.5	22.6	19.7	15.1	8.3	17.0	17.9	14.4
	5	14.8	9.3	30.0	18.2	18.1	--	14.4	17.6	16.0
	6	15.2	--	41.2	16.2	24.2	--	12.0	20.9	16.5
Weighted av.		14.0	10.2	23.1	17.1	16.1	11.1	17.0	17.4	15.2
1,000 Super-	1	11.9	7.2	12.0	13.6	11.2	13.6	17.3	19.2	16.7
phosphate	2	16.0	9.9	15.2	12.8	13.5	15.5	20.1	15.6	17.1
750 Nitrate of	3	12.7	6.6	16.2	12.5	12.0	12.0	19.3	15.1	15.5
soda	4	6.3	7.1	12.4	16.8	10.7	12.7	16.5	16.7	15.3
	5	8.9	--	12.1	15.3	12.1	--	15.5	16.3	15.9
	6	12.3	--	14.4	12.3	13.0	--	--	15.5	15.5
Weighted av.		13.0	7.5	14.1	14.5	12.3	13.5	18.3	16.1	16.0
None	1	12.9	12.3	15.4	16.8	14.4	14.2	12.3	14.9	13.8
	2	16.8	16.6	18.3	15.0	16.7	18.0	17.4	14.3	16.6
	3	16.1	16.7	22.0	13.5	17.1	17.5	16.9	15.5	16.6
	4	10.3	16.0	18.8	18.0	15.8	15.9	14.1	18.6	16.2
	5	13.8	--	21.4	17.4	17.5	--	17.3	17.6	17.5
	6	--	--	--	--	--	--	18.5	18.1	18.3
Weighted av.		14.7	16.4	19.1	15.2	16.4	17.1	15.7	16.7	16.5

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 16. LENGTH OF LINT AT UPPER 25% POINT OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF ADEQUATE SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-38 AND 1940

Fertilizer per acre, pounds	Week of blooming	Year							
		1933	1934	1935	1936	1937	1938	1940	Av. all years
		Length of lint in inches							
25,000 Manure	1	.89	.88	.98	1.05	.93	1.04	.99	.97
500 Superphosphate	2	.90	.97	1.00	1.05	.98	1.04	.89	.98
	3	.90	.97	.99	.97	1.00	1.04	.90	.97
	4	.96	.93	.98	.98	1.02	1.00	.96	.98
	5	.95	--	1.03	.99	1.02	.99	.97	.99
	6	--	--	--	.95	--	.95	.97	.96
Weighted av.[1]		.90	.95	.99	1.00	1.00	1.02	.93	.97
1,000 Superphosphate	1	.97	.87	1.03	.99	.91	.94	1.01	.96
750 Nitrate of Soda	2	.91	.91	1.00	1.01	1.00	.98	.89	.96
250 Muriate	3	.86	.96	.96	.97	1.02	.97	.88	.95
	4	.86	.99	.95	.93	1.00	.92	1.10	.96
	5	.99	.96	.98	1.01	.99	.94	1.01	.98
	6	.95	--	--	.99	--	.93	.93	.95
Weighted av.		.92	.93	.98	.98	1.01	.96	1.01	.97
1,000 Superphosphate	1	.95	.86	--	1.07	.99	1.06	.83	.96
250 Muriate	2	.94	.92	--	1.00	.94	.93	.83	.93
	3	.91	.88	--	.93	.95	.95	.88	.92
	4	.90	.86	--	.95	1.00	.91	.92	.92
	5	.95	--	--	1.05	.93	.95	.91	.96
	6	--	--	--	.96	--	--	.91	.94
Weighted av.		.94	.89	--	.99	.96	.94	.88	.94
750 Nitrate of Soda	1	.92	.91	.95	1.03	.92	1.02	.92	.95
250 Muriate	2	.90	.99	1.01	1.09	.97	.94	.84	.96
	3	.85	1.02	.94	1.02	.96	.92	.94	.95
	4	.86	.95	.96	.94	.93	.95	.95	.93
	5	.92	--	1.01	1.01	.97	.96	.92	.97
	6	.93	--	--	1.02	--	.86	1.00	.95
Weighted av.		.89	.98	.97	1.03	.95	.95	.92	.96
1,000 Superphosphate	1	.97	.91	1.00	1.08	.94	.97	.95	.97
750 Nitrate of Soda	2	.93	.96	1.00	1.02	.97	.96	.93	.97
	3	.91	.98	.91	.97	1.00	1.01	.95	.96
	4	.94	.93	.82	.94	.92	.96	1.05	.94
	5	.95	--	--	1.04	--	.99	1.01	1.00
	6	.93	--	--	1.01	--	.86	.97	.94
Weighted av.		.94	.95	.95	1.01	.97	.97	.99	.97
None	1	.98	.92	.99	1.07	1.00	1.03	.98	1.00
	2	.93	.99	.99	1.07	1.03	.99	.87	.98
	3	.93	.98	.95	.91	.99	1.03	.99	.97
	4	.93	.96	--	1.04	.97	.99	.97	.98
	5	.97	--	--	.99	--	.88	.98	.96
	6	1.02	--	--	--	--	--	--	1.02
Weighted av.		.95	.97	.98	1.03	1.00	1.00	.95	.98

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 17. LENGTH OF LINT AT UPPER 25% POINT OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF DEFICIENT SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-35, 1937-38, AND 1940

Fertilizer per acre, pounds	Week of blooming	Year						
		1933	1934	1935	1937	1938	1940	Av. all years
		Length of lint in inches						
25,000 Manure	1	1.01	.87	1.00	.96	1.13	.94	.99
500 Superphosphate	2	.99	.81	.95	.94	1.08	.93	.95
	3	.79	.87	.94	.86	1.02	.91	.90
	4	.77	.81	.86	.93	.91	.87	.86
	5	.83	--	.81	.94	.90	.85	.87
	6	--	--	--	--	.88	.85	.87
Weighted av.[1]		.94	.83	.95	.90	1.03	.89	.92
1,000 Superphosphate	1	.89	.85	.97	.95	1.08	.90	.94
750 Nitrate of soda	2	.88	.84	.96	.96	1.00	.89	.92
250 Muriate	3	.76	.85	.91	.89	.93	.88	.87
	4	.69	.84	.81	.85	.92	.86	.83
	5	--	--	.91	--	.82	.84	.86
	6	--	--	--	--	.85	.89	.87
Weighted av.		.87	.84	.92	.91	.92	.87	.89
1,000 Superphosphate	1	.92	.87	.90	.98	1.03	.82	.92
250 Muriate	2	.94	.90	.90	.95	1.03	.80	.92
	3	.81	.91	.93	.92	1.03	.79	.90
	4	.78	.90	.87	.90	.98	.84	.88
	5	.81	--	.92	.94	.95	.84	.89
	6	--	--	--	--	1.00	.89	.95
Weighted av.		.90	.89	.91	.93	1.01	.82	.91
750 Nitrate of soda	1	.92	.91	--	.94	.98	.86	.92
250 Muriate	2	.96	.86	--	.94	.96	.80	.90
	3	.82	.87	--	.92	.87	.78	.85
	4	.76	.88	--	.91	.89	.85	.86
	5	.76	--	--	--	.78	.90	.81
	6	--	--	--	--	.77	.93	.85
Weighted av.		.91	.87	--	.93	.90	.82	.89
1,000 Superphosphate	1	.92	.91	1.03	.97	1.00	.92	.96
750 Nitrate of soda	2	.89	.87	.92	1.01	.99	.88	.93
	3	.84	.87	.86	.89	.84	.91	.87
	4	.74	.89	.81	.89	.84	.88	.84
	5	.78	--	--	--	.79	.87	.81
	6	--	--	--	--	--	.93	.93
Weighted av.		.88	.88	.91	.94	.90	.89	.90
None	1	.94	.88	.93	.96	.94	1.00	.94
	2	.93	.92	.97	.98	.93	.85	.93
	3	.94	.95	.90	.95	.93	.88	.93
	4	.86	.98	.92	.93	.91	.92	.92
	5	.82	--	--	--	.86	.89	.86
	6	--	--	--	--	.83	1.04	.94
Weighted av.		.92	.91	.94	.96	.92	.90	.93

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 18. MEAN LENGTH OF FIBERS OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF ADEQUATE SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-38 AND 1940

Fertilizer per acre, pounds	Week of blooming	Year							
		1933	1934	1935	1936	1937	1938	1940	Av. all years
		Length of lint in inches							
25,000 Manure	1	.63	.63	.71	.75	.68	.78	.69	.70
500 Superphosphate	2	.65	.70	.72	.76	.72	.77	.60	.70
	3	.65	.69	.71	.68	.74	.79	.62	.70
	4	.71	.65	.72	.71	.75	.74	.67	.71
	5	.70	--	.75	.71	.73	.73	.67	.72
	6	--	--	--	.67	--	.68	.68	.68
Weighted av.[1]		.65	.68	.72	.71	.73	.76	.64	.70
1,000 Superphosphate	1	.71	.64	.73	.71	.64	.65	.75	.69
750 Nitrate of Soda	2	.65	.67	.72	.72	.74	.70	.60	.69
250 Muriate	3	.63	.70	.69	.69	.74	.69	.62	.68
	4	.63	.71	.70	.67	.73	.65	.84	.70
	5	.74	.68	.73	.72	.60	.67	.74	.70
	6	.50	--	--	.70	--	.66	.68	.64
Weighted av.		.66	.68	.70	.70	.72	.68	.74	.70
1,000 Superphosphate	1	.70	.62	--	.78	.73	.77	.58	.70
250 Muriate	2	.67	.67	--	.73	.67	.67	.58	.67
	3	.66	.61	--	.65	.71	.67	.64	.66
	4	.64	.59	--	.67	.74	.62	.66	.65
	5	.69	--	--	.75	.68	.70	.66	.70
	6	--	--	--	.67	--	--	.65	.66
Weighted av.		.68	.64	--	.71	.70	.67	.63	.67
750 Nitrate of Soda	1	.65	.62	.68	.75	.64	.75	.65	.68
250 Muriate	2	.63	.75	.74	.80	.72	.68	.59	.70
	3	.61	.76	.68	.74	.70	.66	.67	.69
	4	.62	.70	.69	.66	.69	.68	.67	.67
	5	.66	--	.74	.73	.72	.68	.64	.70
	6	.66	--	--	.74	--	.63	.73	.69
Weighted av.		.63	.72	.70	.74	.70	.68	.65	.69
1,000 Superphosphate	1	.70	.68	.74	.79	.71	.68	.68	.71
750 Nitrate of Soda	2	.67	.72	.73	.73	.72	.70	.68	.71
	3	.65	.72	.65	.68	.76	.73	.69	.70
	4	.68	.67	.58	.64	.66	.69	.79	.67
	5	.69	--	--	.74	--	.71	.74	.72
	6	.67	--	--	.74	--	.59	.68	.67
Weighted av.		.68	.71	.69	.72	.72	.70	.73	.71
None	1	.71	.67	.72	.78	.74	.73	.71	.72
	2	.67	.74	.72	.77	.77	.70	.61	.71
	3	.67	.72	.70	.65	.73	.73	.72	.70
	4	.67	.70	--	.77	.72	.72	.70	.71
	5	.69	--	--	.72	--	.62	.70	.68
	6	.75	--	--	--	--	--	--	.75
Weighted av.		.69	.71	.71	.75	.74	.71	.68	.71

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 19. MEAN LENGTH OF FIBERS OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF DEFICIENT SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-35, 1937-38, AND 1940

Fertilizer per acre, pounds	Week of blooming	Year						
		1933	1934	1935	1937	1938	1940	Av. all years
		Length of lint in inches						
25,000 Manure	1	.74	.61	.72	.69	.88	.60	.71
500 Superphosphate	2	.71	.56	.67	.68	.81	.65	.68
	3	.56	.64	.67	.61	.76	.62	.64
	4	.55	.57	.62	.67	.65	.61	.61
	5	.59	--	.58	.69	.66	.58	.62
	6	--	--	--	--	.65	.59	.62
Weighted av.[1]		.68	.58	.68	.65	.77	.62	.66
1,000 Superphosphate	1	.64	.61	.69	.67	.81	.59	.67
750 Nitrate of soda	2	.62	.60	.68	.71	.73	.59	.66
250 Muriate	3	.53	.61	.65	.63	.67	.59	.61
	4	.53	.61	.59	.62	.67	.59	.60
	5	--	--	.66	--	.58	.58	.61
	6	--	--	--	--	.62	.60	.61
Weighted av.		.62	.60	.66	.66	.67	.59	.63
1,000 Superphosphate	1	.67	.62	.63	.70	.74	.56	.65
250 Muriate	2	.67	.64	.63	.69	.77	.54	.66
	3	.56	.64	.65	.67	.74	.53	.63
	4	.54	.64	.62	.64	.73	.57	.62
	5	.58	--	.68	.66	.70	.57	.64
	6	--	--	--	--	.73	.60	.67
Weighted av.		.64	.63	.64	.67	.74	.56	.64
750 Nitrate of soda	1	.67	.65	--	.69	.73	.59	.67
250 Muriate	2	.68	.62	--	.70	.68	.54	.64
	3	.57	.64	--	.68	.59	.53	.60
	4	.54	.66	--	.65	.61	.59	.61
	5	.57	--	--	--	.56	.64	.59
	6	--	--	--	--	.52	.67	.60
Weighted av.		.65	.63	--	.68	.63	.57	.63
1,000 Superphosphate	1	.57	.66	.74	.71	.72	.64	.67
750 Nitrate of soda	2	.63	.63	.64	.74	.70	.63	.66
	3	.60	.64	.61	.65	.58	.65	.62
	4	.51	.66	.58	.65	.57	.63	.60
	5	.53	--	--	--	.56	.63	.57
	6	--	--	--	--	--	.67	.67
Weighted av.		.60	.64	.64	.69	.63	.64	.64
None	1	.69	.64	.66	.70	.68	.72	.68
	2	.66	.67	.71	.74	.67	.60	.68
	3	.68	.69	.65	.69	.66	.61	.66
	4	.60	.73	.66	.68	.66	.64	.66
	5	.50	--	--	--	.59	.63	.57
	6	--	--	--	--	.60	.77	.69
Weighted av.		.66	.67	.68	.71	.66	.63	.67

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 20. BREAKING STRENGTH OF FIBERS OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF ADEQUATE SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-38 AND 1940

Fertilizer per acre, pounds	Week of blooming	Year							
		1933	1934	1935	1936	1937	1938	1940	Av. all years
		Breaking strength, 1,000 pounds per sq. in.							
25,000 Manure	1	61	57	53	58	44	46	61	54
500 Superphosphate	2	64	52	54	56	51	46	61	55
	3	63	54	52	51	54	49	62	55
	4	66	54	57	52	51	50	57	55
	5	61	--	56	54	48	55	60	56
	6	--	--	--	59	--	50	60	56
Weighted av.[1]		63	54	53	54	52	50	60	55
1,000 Superphosphate	1	57	62	54	52	45	48	58	54
750 Nitrate of Soda	2	61	61	57	54	47	45	60	55
250 Muriate	3	60	54	54	53	51	52	60	55
	4	60	56	57	56	50	46	60	55
	5	61	56	59	58	47	49	62	56
	6	45	--	--	66	--	49	57	54
Weight av.		60	59	55	55	50	48	60	55
1,000 Superphosphate	1	65	63	--	64	48	48	57	58
250 Muriate	2	68	58	--	65	47	47	58	57
	3	63	59	--	61	48	49	61	57
	4	64	65	--	60	53	52	62	59
	5	67	--	--	65	49	50	60	58
	6	--	--	--	59	--	--	62	61
Weighted av.		66	60	--	63	48	49	61	58
750 Nitrate of Soda	1	55	64	56	59	54	49	65	57
250 Muriate	2	59	63	61	57	52	45	59	57
	3	59	58	63	58	52	52	52	56
	4	61	60	62	55	54	56	50	57
	5	60	--	64	64	55	54	60	60
	6	57	--	--	67	--	54	58	59
Weighted av.		58	62	61	59	53	51	54	57
1,000 Superphosphate	1	59	66	61	68	55	50	60	60
750 Nitrate of Soda	2	67	65	64	68	56	49	61	61
	3	64	61	69	72	59	55	62	63
	4	69	64	67	69	59	56	53	62
	5	66	--	--	72	--	56	53	61
	6	66	--	--	75	--	65	56	65
Weighted av.		65	64	65	69	56	53	57	61
None	1	62	65	61	67	58	51	54	60
	2	64	64	65	67	52	49	42	58
	3	60	60	65	68	53	57	51	59
	4	56	65	--	67	55	52	53	58
	5	65	--	--	66	--	58	57	62
	6	60	--	--	--	--	--	--	60
Weighted av.		62	64	64	67	53	52	49	59

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 21. BREAKING STRENGTH OF FIBERS OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF DEFICIENT SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-35, 1937-38, AND 1940

Fertilizer per acre, pounds	Week of blooming	Year						
		1933	1934	1935	1937	1938	1940	Av. all years
		Breaking strength, 1,000 pounds per sq. in.						
25,000 Manure	1	57	59	59	59	56	69	60
500 Superphosphate	2	67	61	64	61	54	69	63
	3	68	54	65	65	59	67	63
	4	66	60	65	68	59	67	64
	5	70	--	59	61	61	71	64
	6	--	--	--	--	48	75	62
Weighted av.[1]		64	60	63	63	57	68	63
1,000 Superphosphate	1	63	65	59	58	48	67	60
750 Nitrate of soda	2	70	67	69	60	51	67	64
250 Muriate	3	69	67	73	63	55	71	66
	4	69	70	74	66	61	71	69
	5	--	--	64	--	62	71	66
	6	--	--	--	--	65	73	69
Weighted av.		68	67	70	62	57	71	66
1,000 Superphosphate	1	65	63	61	53	49	67	60
250 Muriate	2	69	66	63	47	48	66	60
	3	68	64	63	54	49	67	61
	4	69	62	66	59	54	64	62
	5	72	--	60	58	59	68	63
	6	--	--	--	--	61	66	64
Weighted av.		68	64	63	54	51	66	61
750 Nitrate of soda	1	70	66	--	54	48	62	60
250 Muriate	2	70	64	--	57	49	68	62
	3	72	59	--	60	53	72	63
	4	71	67	--	57	54	68	63
	5	75	--	--	--	54	68	66
	6	--	--	--	--	53	63	58
Weighted av.		70	64	--	58	52	69	63
1,000 Superphosphate	1	62	73	69	54	55	63	63
750 Nitrate of soda	2	66	69	69	58	53	72	65
	3	70	70	71	58	56	68	66
	4	68	66	69	55	62	68	65
	5	63	--	--	--	64	72	66
	6	--	--	--	--	--	78	--
Weighted av.		66	70	70	57	57	69	65
None	1	60	67	60	57	44	70	60
	2	64	69	64	58	44	67	61
	3	61	66	73	55	58	63	63
	4	67	69	72	59	57	55	63
	5	63	--	--	--	56	70	63
	6	--	--	--	--	--	71	71
Weighted av.		62	68	66	57	51	61	61

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 22. MEAN WEIGHT PER INCH OF FIBERS OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF ADEQUATE SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-38 AND 1940

Fertilizer per acre, pounds	Week of blooming	Year							
		1933	1934	1935	1936	1937	1938	1940	Av. all years
		Weight per inch — 10^{-4} milligrams							
25,000 Manure	1	63	65	57	54	62	65	60	61
500 Superphosphate	2	65	57	55	57	65	60	69	61
	3	64	59	55	59	58	58	68	60
	4	62	55	51	56	60	61	65	59
	5	57	--	48	53	58	61	60	56
	6	--	--	--	60	--	58	62	60
Weighted av.[1]		64	59	55	57	61	60	66	60
1,000 Superphosphate	1	63	65	52	59	70	69	58	62
750 Nitrate of Soda	2	66	61	52	59	66	68	70	63
250 Muriate	3	62	60	53	54	60	62	73	61
	4	62	54	47	55	55	68	58	57
	5	58	59	44	52	60	68	62	58
	6	59	--	--	57	--	69	60	61
Weighted av.		64	61	52	56	59	67	63	60
1,000 Superphosphate	1	60	68	--	58	68	64	70	65
250 Muriate	2	60	63	--	54	71	68	70	64
	3	65	60	--	58	66	62	69	63
	4	60	54	--	59	58	71	74	63
	5	63	--	--	59	60	68	60	62
	6	--	--	--	63	--	--	64	64
Weighted av.		61	64	--	57	67	67	71	65
750 Nitrate of Soda	1	62	62	62	64	72	67	69	65
250 Muriate	2	65	60	58	55	73	68	67	64
	3	62	56	58	56	70	63	69	62
	4	66	57	56	54	68	62	70	62
	5	64	--	53	57	66	66	70	63
	6	59	--	--	56	--	71	64	63
Weighted av.		64	59	58	57	70	65	69	63
1,000 Superphosphate	1	62	62	56	58	68	69	53	61
750 Nitrate of Soda	2	62	60	55	54	66	67	68	62
	3	60	55	58	47	65	65	63	59
	4	60	54	57	47	61	60	56	56
	5	61	--	--	56	--	63	59	60
	6	61	--	--	65	--	65	62	63
Weighted av.		61	59	56	52	64	65	60	60
None	1	64	63	59	60	68	67	73	65
	2	63	59	56	57	68	68	73	63
	3	61	54	56	59	67	62	68	61
	4	60	58	--	48	70	62	65	61
	5	59	--	--	56	--	69	62	62
	6	52	--	--	--	--	--	--	52
Weighted av.		63	59	57	57	68	65	69	63

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 23. MEAN WEIGHT PER INCH OF FIBERS OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF DEFICIENT SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-35, 1937-38, AND 1940

Fertilizer per acre, pounds	Week of blooming	Year						
		1933	1934	1935	1937	1938	1940	Av. all years
		Weight per inch — 10^{-4} milligrams						
25,000 Manure	1	50	58	53	59	58	60	56
500 Superphosphate	2	52	68	57	57	52	69	59
	3	61	67	57	56	50	68	60
	4	65	66	59	58	57	71	63
	5	60	--	55	53	54	71	59
	6	--	--	--	--	57	74	66
Weighted av.[1]		54	65	56	57	53	69	59
1,000 Superphosphate	1	54	65	52	53	59	69	59
750 Nitrate of soda	2	56	68	53	52	53	70	59
250 Muriate	3	58	66	57	57	54	69	60
	4	68	66	62	60	55	67	63
	5	--	--	68	--	59	67	65
	6	--	--	--	--	62	67	65
Weighted av.		56	67	56	56	56	68	60
1,000 Superphosphate	1	58	64	63	67	72	69	66
250 Muriate	2	52	67	62	64	64	68	63
	3	61	63	61	70	57	75	65
	4	64	58	65	64	58	73	64
	5	65	--	62	63	64	67	64
	6	--	--	--	--	61	61	61
Weighted av.		56	65	62	66	62	72	64
750 Nitrate of soda	1	54	60	--	66	57	71	62
250 Muriate	2	50	64	--	64	63	75	63
	3	56	60	--	65	60	70	62
	4	66	60	--	64	59	70	64
	5	66	--	--	--	64	63	64
	6	--	--	--	--	67	59	63
Weighted av.		53	62	--	65	61	70	62
1,000 Superphosphate	1	53	56	46	61	65	60	57
750 Nitrate of soda	2	55	59	56	59	57	69	59
	3	57	65	61	64	53	62	60
	4	66	51	65	66	61	66	63
	5	59	--	--	--	67	61	62
	6	--	--	--	--	--	64	64
Weighted av.		55	58	57	62	59	64	59
None	1	60	64	60	64	64	71	64
	2	62	56	58	62	65	73	63
	3	56	62	64	62	57	65	61
	4	60	58	64	62	62	64	62
	5	69	--	--	--	64	79	71
	6	--	--	--	--	73	67	70
Weighted av.		60	60	61	62	62	67	62

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 24. PERCENTAGE OF IMMATURE FIBERS OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF ADEQUATE SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-38 AND 1940

Fertilizer per acre, pounds	Week of blooming	Year							
		1933	1934	1935	1936	1937	1938	1940	Av. all years
		Per cent immature fibers							
25,000 Manure	1	52	50	29	19	25	21	38	33
500 Superphosphate	2	48	51	29	19	26	29	39	34
	3	50	55	24	18	30	25	38	34
	4	52	56	26	18	29	21	39	34
	5	57	--	26	20	36	22	40	34
	6	--	--	--	22	--	24	39	28
Weighted av.[1]		50	52	27	19	29	24	39	34
1,000 Superphosphate	1	53	52	22	20	27	19	35	33
750 Nitrate of Soda	2	52	51	26	18	26	20	39	33
250 Muriate	3	53	52	28	19	27	21	38	34
	4	56	52	28	23	30	27	38	36
	5	58	48	31	20	38	28	38	37
	6	58	--	--	17	--	27	39	35
Weighted av.		53	51	27	20	29	23	38	34
1,000 Superphosphate	1	52	46	--	20	28	32	39	36
250 Muriate	2	55	51	--	23	29	35	38	39
	3	51	55	--	21	25	31	39	37
	4	52	61	--	20	30	30	37	38
	5	50	--	--	20	34	35	38	35
	6	--	--	--	18	--	--	37	28
Weighted av.		53	51	--	21	28	33	38	37
750 Nitrate of Soda	1	56	50	23	18	26	34	30	34
250 Muriate	2	56	49	24	17	28	30	32	34
	3	57	51	23	20	26	35	29	34
	4	59	52	27	19	23	36	30	35
	5	61	--	24	20	27	33	31	33
	6	62	--	--	19	--	26	29	34
Weighted av.		57	50	24	19	26	33	30	34
1,000 Superphosphate	1	56	42	23	17	23	23	35	31
750 Nitrate of Soda	2	51	51	25	22	26	22	34	33
	3	53	52	22	30	28	26	31	35
	4	55	46	21	35	34	30	28	36
	5	55	--	--	24	--	30	28	34
	6	54	--	--	21	--	35	32	36
Weighted av.		53	49	23	25	29	26	30	34
None	1	58	46	20	13	22	24	28	30
	2	58	44	23	18	25	31	28	32
	3	58	48	20	17	25	32	29	33
	4	60	49	--	21	28	38	27	37
	5	61	--	--	20	--	37	31	37
	6	59	--	--	--	--	--	--	59
Weighted av.		58	45	21	17	26	32	28	32

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 25. PERCENTAGE OF IMMATURE FIBERS OF COTTON GROWN WITH DIFFERENT FERTILIZER TREATMENTS UNDER A CONDITION OF DEFICIENT SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1933-35, 1937-38, AND 1940

Fertilizer per acre, pounds	Week of blooming	Year						
		1933	1934	1935	1937	1938	1940	Av. all years
		Per cent immature fibers						
25,000 Manure	1	53	57	47	28	20	43	41
500 Superphosphate	2	53	54	47	36	27	41	43
	3	55	53	45	33	32	42	43
	4	47	50	45	31	36	41	42
	5	48	--	50	30	31	42	40
	6	--	--	--	--	29	39	34
Weighted av.[1]		53	54	46	34	29	41	43
1,000 Superphosphate	1	54	53	37	41	28	40	42
750 Nitrate of soda	2	57	54	38	31	39	39	43
250 Muriate	3	58	52	32	29	41	40	42
	4	55	52	33	28	36	39	41
	5	--	--	29	--	36	40	35
	6	--	--	--	--	25	41	33
Weighted av.		56	53	35	30	37	39	42
1,000 Superphosphate	1	53	50	30	25	23	41	37
250 Muriate	2	53	52	30	27	27	40	38
	3	49	52	29	24	32	41	38
	4	48	51	30	29	30	36	37
	5	40	--	25	21	26	39	30
	6	--	--	--	--	25	40	33
Weighted av.		52	51	29	26	28	38	37
750 Nitrate of soda	1	56	54	--	34	36	38	44
250 Muriate	2	57	55	--	29	37	37	43
	3	59	49	--	29	38	37	42
	4	51	46	--	29	38	36	40
	5	51	--	--	--	38	36	42
	6	--	--	--	--	48	35	42
Weighted av.		57	53	--	29	38	36	43
1,000 Superphosphate	1	56	53	28	35	33	33	40
750 Nitrate of soda	2	60	50	28	34	39	38	42
	3	57	46	27	29	44	36	40
	4	55	55	25	24	36	35	38
	5	58	--	--	--	31	34	41
	6	--	--	--	--	--	34	34
Weighted av.		58	51	27	30	38	35	40
None	1	53	51	27	26	31	19	35
	2	56	52	29	30	32	31	38
	3	57	49	28	28	29	30	37
	4	59	50	25	36	34	32	39
	5	60	--	--	--	32	32	41
	6	--	--	--	--	27	22	25
Weighted av.		56	51	28	30	32	31	38

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 26. WEIGHT OF SEED COTTON PER BOLL OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1937-38

Variety	Week of blooming	Moisture condition of the soil					
		Adequate			Deficient		
		1937	1938	Av.	1937	1938	Av.
		Weight of seed cotton per boll in grams					
Mexican Big Boll	1	6.30	7.58	6.94	6.46	7.03	6.75
	2	7.87	7.05	7.46	6.24	6.23	6.24
	3	7.94	9.10	8.52	6.21	5.86	6.04
	4	7.18	7.00	7.09	5.63	5.29	5.46
	5	6.43	6.27	6.35	--	4.33	--
	6	--	6.08	--	--	4.72	--
Weighted av.[1]		7.55	6.83	7.19	6.15	5.47	5.81
Cook 1006	1	4.76	5.93	5.35	5.10	5.65	5.38
	2	5.98	5.56	5.77	5.36	5.58	5.47
	3	5.92	5.31	5.62	4.70	5.26	4.98
	4	5.69	5.21	5.45	4.12	3.95	4.04
	5	5.31	5.24	5.28	3.47	3.53	3.50
	6	--	5.70	--	--	4.01	--
Weighted av.		5.76	5.35	5.56	4.70	4.87	4.79
Clevewilt Strain 5	1	5.57	5.90	5.74	4.95	5.16	5.06
	2	6.48	5.82	6.15	5.06	4.76	4.91
	3	6.41	5.17	5.79	4.65	4.07	4.36
	4	5.96	4.81	5.39	4.24	3.71	3.98
	5	5.71	4.99	5.35	3.81	3.44	3.63
	6	--	4.57	--	--	3.86	--
Weighted av.		6.21	5.41	5.81	4.75	4.18	4.47
Stoneville 5 A	1	5.25	6.01	5.63	4.95	4.70	4.78
	2	6.06	5.89	5.98	5.13	5.22	5.18
	3	6.07	5.20	5.64	4.68	4.63	4.66
	4	5.69	5.01	5.35	4.44	4.03	4.24
	5	5.21	4.60	4.91	3.32	3.41	3.37
	6	--	4.32	--	--	3.73	--
Weighted av.		5.87	5.40	5.64	4.75	4.33	4.54

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 27. NUMBER OF SEED PER BOLL OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1937-38

Variety	Week of blooming	Moisture condition of the soil					
		Adequate			Deficient		
		1937	1938	Av.	1937	1938	Av.
		Number of seed per boll					
Mexican Big Boll	1	30.4	32.3	31.4	31.8	30.6	31.2
	2	32.6	29.6	31.1	33.7	29.7	31.7
	3	33.9	30.0	32.0	35.0	29.8	32.4
	4	33.0	28.9	31.0	34.6	30.5	32.6
	5	32.0	30.5	31.3	--	28.1	--
	6	--	27.2	--	--	30.7	--
Weighted av.[1]		33.2	29.9	31.6	34.3	29.6	32.0
Cook 1006	1	29.0	28.4	28.7	32.1	29.0	30.6
	2	32.9	26.8	29.9	34.4	30.7	32.6
	3	32.8	26.4	29.6	33.3	31.3	32.3
	4	32.4	26.2	29.3	33.5	24.5	29.0
	5	32.6	28.6	30.6	31.0	25.1	28.0
	6	--	31.1	--	--	30.4	--
Weighted av.		32.6	27.5	30.1	33.5	28.5	31.0
Clevewilt Strain 5	1	28.7	28.6	28.7	29.2	28.5	28.9
	2	30.9	28.2	29.6	31.2	29.1	30.2
	3	31.4	25.6	28.5	31.0	28.2	29.6
	4	31.6	26.1	28.9	31.0	26.0	28.5
	5	32.1	26.9	29.5	30.6	26.2	28.4
	6	--	25.3	--	--	33.5	--
Weighted av.		31.2	27.1	29.2	30.9	27.5	29.2
Stoneville 5 A	1	30.1	30.5	30.3	30.1	25.9	28.0
	2	31.0	30.9	31.0	31.4	29.8	30.6
	3	31.8	28.0	29.9	31.8	29.3	30.6
	4	31.2	28.2	29.7	31.2	26.8	29.0
	5	31.1	26.1	28.6	28.7	25.4	27.1
	6	--	24.6	--	--	27.5	--
Weighted av.		31.4	29.0	30.2	31.4	27.5	29.5

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 28. WEIGHT PER SEED OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1937-38

Variety	Week of blooming	Moisture condition of the soil					
		Adequate			Deficient		
		1937	1938	Av.	1937	1938	Av.
		Weight per seed in milligrams					
Mexican Big Boll	1	131	153	142	127	153	140
	2	155	159	157	115	144	130
	3	149	147	148	107	133	120
	4	137	167	152	96	116	106
	5	127	136	132	--	102	--
	6	--	131	--	--	101	--
Weighted av.[1]		144	152	148	109	124	117
Cook 1006	1	99	135	117	104	127	116
	2	116	134	125	101	118	110
	3	114	127	121	89	110	100
	4	110	126	118	76	106	91
	5	102	116	109	69	94	82
	6	--	124	--	--	81	--
Weighted av.		111	127	118	89	112	101
Clevewilt Strain 5	1	117	129	124	107	116	112
	2	132	131	132	105	108	107
	3	127	125	126	95	96	96
	4	116	114	115	82	95	89
	5	108	127	118	74	86	80
	6	--	114	--	--	83	--
Weighted av.		123	125	124	97	100	99
Stoneville 5 A	1	96	125	111	98	112	105
	2	120	121	121	101	118	110
	3	119	117	118	90	103	97
	4	114	82	98	85	100	93
	5	103	111	107	62	88	75
	6	--	115	--	--	90	--
Weighted av.		116	117	117	92	103	98

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 29. WEIGHT OF LINT PER SEED OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1937-38

Variety	Week of blooming	Moisture condition of the soil					
		Adequate			Deficient		
		1937	1938	Av.	1937	1938	Av.
		Weight of lint per seed in milligrams					
Mexican Big Boll	1	76	82	79	76	80	78
	2	86	79	83	71	69	70
	3	86	79	83	70	64	67
	4	80	74	77	67	57	62
	5	73	62	68	--	53	--
	6	--	76	--	--	52	--
Weighted av.[1]		83	77	80	70	61	66
Cook 1006	1	65	74	70	55	68	62
	2	66	73	69	55	63	59
	3	67	73	70	53	60	57
	4	65	74	70	48	55	52
	5	60	68	64	43	47	45
	6	--	59	--	--	44	--
Weighted av.		65	71	68	52	59	56
Clevewilt Strain 5	1	77	77	77	62	64	63
	2	79	75	77	57	56	57
	3	77	76	77	55	48	57
	4	73	70	72	55	48	57
	5	70	69	70	51	45	48
	6	--	66	--	--	32	--
Weighted av.		76	74	75	56	52	54
Stoneville 5 A	1	78	72	75	66	68	67
	2	75	70	73	62	57	60
	3	72	69	71	57	55	56
	4	69	68	69	58	51	55
	5	65	66	66	53	46	50
	6	--	64	--	--	46	--
Weighted av.		71	69	70	59	54	57

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 30. PERCENTAGE OF LINT OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1937-38

Variety	Week of blooming	Moisture condition of the soil					
		Adequate			Deficient		
		1937	1938	Av.	1937	1938	Av.
				Per cent lint			
Mexican Big Boll	1	36.7	34.7	35.7	37.3	34.3	35.8
	2	35.7	33.4	34.6	38.1	31.8	35.0
	3	36.5	34.8	35.7	39.5	32.8	36.2
	4	36.9	32.1	34.5	40.8	33.1	37.0
	5	36.7	33.5	35.1	--	34.0	--
	6	--	37.2	--	--	33.7	--
Weighted av.[1]		36.5	33.8	35.2	39.1	33.0	36.1
Cook 1006	1	39.7	35.5	37.6	34.6	34.8	34.7
	2	36.3	35.3	35.8	35.2	34.8	35.0
	3	37.0	36.7	36.9	37.2	35.3	36.3
	4	37.1	37.1	37.1	38.4	34.1	36.3
	5	37.1	36.9	37.0	38.0	33.4	35.7
	6	--	31.9	--	--	33.5	--
Weighted av.		37.0	36.5	36.8	36.9	34.5	35.7
Clevewilt Strain 5	1	39.7	37.5	38.6	36.6	35.1	35.9
	2	37.3	36.4	36.9	35.2	34.3	34.8
	3	37.6	37.9	37.8	36.8	33.4	35.1
	4	38.7	37.9	37.3	39.7	33.3	36.5
	5	39.5	37.1	38.3	40.6	34.5	37.6
	6	--	36.4	36.4	--	28.3	--
Weighted av.		38.0	37.2	37.6	36.6	34.0	35.3
Stoneville 5 A	1	44.6	36.7	40.7	40.2	37.7	39.0
	2	38.1	36.4	37.3	37.8	32.5	35.2
	3	37.9	37.4	37.7	38.7	35.1	36.9
	4	37.6	38.2	37.9	40.5	34.4	37.5
	5	38.7	37.4	38.1	46.1	34.6	40.4
	6	--	36.6	--	--	33.7	--
Weighted av.		38.0	37.2	37.6	38.9	34.4	36.7

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 31. PERCENTAGE OF OIL IN SEED OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1937-38

Variety	Week of blooming	Moisture condition of the soil					
		Adequate			Deficient		
		1937	1938	Av.	1937	1938	Av.
		Per cent oil in seed					
Mexican Big Boll	1	24.0	24.1	24.1	19.9	18.9	19.4
	2	24.9	22.8	23.9	18.9	18.0	18.5
	3	25.0	23.4	24.2	21.2	17.9	19.6
	4	25.1	23.9	24.5	21.4	19.8	20.6
	5	24.3	24.2	24.3	--	18.2	--
	6	--	23.7	--	--	19.3	--
Weighted av.[1]		24.9	23.5	24.2	20.4	18.6	19.5
Cook 1006	1	23.5	22.5	23.0	21.5	20.3	20.9
	2	22.5	21.9	22.2	20.6	19.0	19.8
	3	22.9	22.3	22.6	20.6	18.7	19.7
	4	21.9	22.5	22.2	20.4	19.4	20.1
	5	21.4	22.9	22.2	21.3	19.2	20.3
	6	--	22.4	--	--	20.1	--
Weighted av.		22.4	22.4	22.4	20.6	19.2	19.9
Clevewilt Strain 5	1	23.8	22.0	22.9	19.1	18.7	18.9
	2	24.4	20.8	22.6	18.2	15.9	17.1
	3	23.6	20.2	21.9	19.6	15.8	17.7
	4	24.6	20.7	22.7	20.1	17.1	18.6
	5	24.1	21.9	23.0	19.6	18.0	18.8
	6	--	23.0	--	--	--	--
Weighted av.		24.1	20.9	22.5	19.1	16.9	18.0
Stoneville 5 A	1	20.7	22.9	21.8	20.2	19.2	19.7
	2	23.2	21.5	22.4	19.6	18.7	19.2
	3	22.7	21.2	22.0	19.6	18.9	19.3
	4	22.1	22.1	22.1	19.4	18.4	18.9
	5	22.4	20.8	21.6	18.7	18.3	18.5
	6	--	20.9	--	--	20.1	--
Weighted av.		22.6	21.6	22.1	19.6	18.7	19.2

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 32. PERCENTAGE OF PROTEIN IN SEED OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1937-38

Variety	Week of blooming	Moisture condition of the soil					
		Adequate			Deficient		
		1937	1938	Av.	1937	1938	Av.
		Per cent protein in the seed					
Mexican Big Boll	1	30.7	33.6	32.2	32.2	32.6	32.4
	2	30.4	33.4	31.9	31.7	30.6	31.2
	3	29.3	32.1	30.7	34.6	31.4	33.0
	4	28.8	31.1	30.0	32.7	31.8	32.3
	5	28.7	30.0	29.9	--	31.9	--
	6	--	--	--	--	32.7	--
Weighted av.[1]		29.3	32.0	30.7	33.2	31.6	32.4
Cook 1006	1	31.0	32.8	31.9	33.9	32.5	33.2
	2	29.7	31.8	30.8	33.0	31.7	32.4
	3	30.0	31.7	30.9	34.4	31.2	32.8
	4	29.3	31.0	30.2	34.0	31.8	32.9
	5	29.0	29.8	29.4	34.3	31.9	33.1
	6	--	29.1	--	--	31.2	--
Weighted av.		29.6	31.3	30.5	34.0	31.7	32.9
Clevewilt Strain 5	1	32.7	32.0	32.4	33.1	30.6	31.9
	2	32.5	31.6	32.1	33.0	28.8	30.9
	3	30.9	30.8	30.9	34.7	28.4	31.6
	4	32.0	30.4	31.2	33.8	30.4	32.1
	5	30.8	30.1	30.5	31.7	31.3	31.5
	6	--	29.6	--	--	--	--
Weighted av.		31.6	31.1	31.4	33.7	29.7	31.7
Stoneville 5 A	1	29.1	32.7	30.9	32.5	32.7	32.6
	2	29.6	31.2	30.4	32.1	31.2	31.7
	3	30.5	30.8	30.7	33.7	31.3	32.5
	4	29.4	31.5	30.5	32.6	30.4	31.5
	5	30.3	28.5	29.4	30.6	31.1	30.9
	6	--	28.8	--	--	30.8	--
Weighted av.		30.0	31.1	30.6	33.0	31.1	32.1

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 33. PERCENTAGE OF FUZZ ON SEED OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1937-38

Variety	Week of blooming	Moisture condition of the soil					
		Adequate			Deficient		
		1937	1938	Av.	1937	1938	Av.
		Per cent fuzz on seed					
Mexican Big Boll	1	9.7	18.5	14.1	15.6	19.1	17.4
	2	12.2	20.1	16.2	16.3	19.6	18.0
	3	12.7	21.8	17.3	12.3	20.2	16.3
	4	11.7	20.6	16.2	10.2	17.4	13.8
	5	11.3	18.0	14.7	--	17.0	--
	6	--	25.0	--	--	14.7	--
Weighted av.[1]		12.1	20.2	16.2	13.5	18.4	16.0
Cook 1006	1	9.4	10.6	10.0	4.7	11.2	8.0
	2	9.8	13.9	11.9	7.2	13.0	10.1
	3	10.5	13.6	12.1	5.8	14.5	10.2
	4	9.9	12.8	11.4	6.1	12.2	9.2
	5	9.3	11.6	10.5	7.8	11.3	9.6
	6	--	13.7	--	--	9.2	--
Weighted av.		10.0	12.9	11.5	6.2	12.6	9.4
Clevewilt Strain 5	1	6.2	11.7	9.0	11.6	11.5	11.6
	2	9.7	15.4	12.6	12.4	14.9	13.7
	3	8.4	12.1	10.3	11.6	14.2	12.9
	4	8.4	10.7	9.6	9.6	12.7	11.2
	5	8.0	10.4	9.2	9.0	11.5	10.3
	6	--	10.9	--	--	9.9	--
Weighted av.		8.6	12.9	10.8	11.6	13.2	12.4
Stoneville 5 A	1	8.6	10.3	9.5	10.3	10.7	10.5
	2	11.5	12.8	12.2	12.0	14.7	13.4
	3	11.5	13.7	12.6	12.1	18.3	15.2
	4	10.9	12.2	11.6	10.5	13.3	11.9
	5	11.5	12.1	11.8	12.0	14.3	13.2
	6	--	10.8	--	--	12.6	--
Weighted av.		11.3	12.6	12.0	11.7	14.5	13.1

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 34. FIBER LENGTH AT UPPER 25% POINT OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1937-38

Variety	Week of blooming	Moisture condition of the soil					
		Adequate			Deficient		
		1937	1938	Av.	1937	1938	Av.
		Fiber length at upper 25 per cent point in inches					
Mexican Big Boll	1	.91	.94	.93	.95	1.08	1.02
	2	1.00	.98	.99	.96	1.00	.98
	3	1.02	.97	1.00	.89	.93	.91
	4	1.00	.92	.96	.85	.92	.89
	5	.99	.94	.97	--	.82	--
	6	--	.93	--	--	.85	--
Weighted av.[1]		1.01	.96	.99	.91	.92	.92
Cook 1006	1	.85	1.01	.93	.96	1.09	1.03
	2	.95	.99	.97	1.04	.99	1.02
	3	1.00	.97	.99	.88	.90	.89
	4	.95	1.00	.98	.84	.89	.87
	5	.95	.98	.97	.89	.83	.86
	6	--	1.04	--	--	.76	--
Weighted av.		.97	.99	.98	.91	.94	.93
Clevewilt Strain 5	1	1.01	.98	.99	1.02	1.03	1.03
	2	1.04	1.03	1.04	1.05	.93	.99
	3	1.09	.96	1.03	.94	.86	.90
	4	1.10	1.01	1.06	.87	.82	.85
	5	1.06	.94	1.00	.90	.76	.83
	6	--	.95	--	--	.69	--
Weighted av.		1.07	.99	1.03	.98	.87	.93
Stoneville 5 A	1	1.00	1.06	1.03	1.08	1.02	1.05
	2	1.09	.98	1.04	1.07	1.03	1.05
	3	1.10	.89	1.00	.92	.94	.93
	4	1.15	.97	1.06	.91	.98	.95
	5	1.17	.97	1.07	.88	.92	.90
	6	--	.95	--	--	.90	--
Weighted av.		1.12	.98	1.05	.96	.97	.97

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 35. MEAN FIBER LENGTH OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1937-38

Variety	Week of blooming	Moisture condition of the soil					
		Adequate			Deficient		
		1937	1938	Av.	1937	1938	Av.
		Mean fiber length in inches					
Mexican Big Boll	1	.64	.65	.65	.67	.81	.74
	2	.74	.70	.72	.71	.73	.72
	3	.74	.69	.72	.63	.67	.65
	4	.73	.65	.69	.62	.67	.65
	5	.60	.67	.64	--	.58	--
	6	--	.66	--	--	.62	--
Weighted av.[1]		.72	.68	.70	.66	.67	.67
Cook 1006	1	.60	.70	.65	.69	.78	.74
	2	.69	.67	.68	.79	.68	.74
	3	.73	.66	.70	.66	.59	.63
	4	.71	.69	.70	.60	.59	.60
	5	.72	.71	.72	.59	.54	.57
	6	--	.72	--	--	.50	--
Weighted av.		.71	.68	.70	.68	.63	.65
Clevewilt Strain 5	1	.72	.67	.70	.76	.67	.72
	2	.74	.70	.72	.75	.57	.66
	3	.81	.66	.74	.67	.54	.61
	4	.81	.71	.76	.62	.53	.58
	5	.78	.66	.72	.67	.49	.58
	6	--	.65	--	--	.45	--
Weighted av.		.79	.68	.74	.70	.55	.63
Stoneville 5 A	1	.70	.71	.71	.81	.68	.75
	2	.79	.67	.73	.79	.69	.74
	3	.81	.60	.71	.65	.62	.64
	4	.85	.68	.77	.65	.66	.66
	5	.86	.68	.77	.63	.61	.62
	6	--	.69	--	--	.59	--
Weighted av.		.82	.66	.74	.69	.65	.67

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 36. BREAKING STRENGTH OF FIBERS OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF MOISTURE, AVERAGES BY 7-DAY PERIODS, 1937-38

Variety	Week of blooming	Moisture condition of the soil					
		Adequate			Deficient		
		1937	1938	Av.	1937	1938	Av.
		Breaking strength of fibers in 1,000 lb. per sq. in.					
Mexican Big Boll	1	45	48	47	58	48	53
	2	47	45	46	60	51	56
	3	51	52	52	63	55	59
	4	50	46	48	66	61	64
	5	47	49	48	--	62	--
	6	--	49	--	--	65	--
Weighted av.[1]		50	48	49	62	57	60
Cook 1006	1	45	50	48	51	54	53
	2	47	48	48	56	51	54
	3	53	52	52	56	54	55
	4	57	56	56	57	60	59
	5	52	59	56	57	66	62
	6	--	64	--	--	70	--
Weighted av.		53	54	54	56	56	56
Clevewilt Strain 5	1	53	58	56	53	53	53
	2	56	55	56	57	51	54
	3	56	60	58	60	59	60
	4	56	58	57	62	60	61
	5	50	62	56	60	61	60
	6	--	68	--	--	65	65
Weighted av.		55	58	57	59	57	58
Stoneville 5 A	1	42	48	45	54	55	55
	2	47	47	47	57	51	57
	3	49	47	48	58	60	59
	4	51	52	52	57	62	60
	5	49	59	54	58	64	61
	6	--	64	--	--	63	--
Weighted av.		49	52	51	57	57	57

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 37. MEAN WEIGHT PER INCH OF FIBERS OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1937-38

Variety	Week of blooming	Moisture condition of the soil					
		Adequate			Deficient		
		1937	1938	Av.	1937	1938	Av.
		Mean fiber weight per inch in 10^{-4} milligrams					
Mexican Big Boll	1	70	69	70	53	59	56
	2	66	68	67	52	53	53
	3	60	62	61	57	54	56
	4	55	68	67	60	55	58
	5	60	68	64	--	59	--
	6	--	69	--	--	62	--
Weighted av.[1]		59	67	63	56	56	56
Cook 1006	1	72	62	67	61	53	57
	2	67	68	68	60	61	61
	3	68	67	68	62	58	60
	4	65	64	65	61	58	60
	5	61	64	63	57	64	61
	6	61	67	64	--	64	--
Weighted av.		66	65	66	61	59	60
Clevewilt Strain 5	1	61	72	67	52	53	53
	2	62	63	63	51	49	50
	3	59	60	60	58	52	55
	4	55	60	58	57	54	56
	5	58	63	61	52	59	56
	6	--	68	--	--	58	--
Weighted av.		59	63	61	55	53	54
Stoneville 5 A	1	54	64	59	58	57	58
	2	57	65	61	62	52	57
	3	63	64	64	60	53	57
	4	61	61	61	55	55	55
	5	60	66	63	51	57	54
	6	--	59	--	--	58	--
Weighted av.		61	64	63	58	55	57

[1] Weighted on basis of number of bolls occurring in each period.

TABLE 38. PERCENTAGE OF IMMATURE FIBERS OF DIFFERENT VARIETIES OF COTTON GROWN UNDER DIFFERENT CONDITIONS OF SOIL MOISTURE, AVERAGES BY 7-DAY PERIODS, 1937-38

Variety	Week of blooming	Moisture condition of the soil					
		Adequate			Deficient		
		1937	1938	Av.	1937	1938	Av.
		Per cent immature fibers					
Mexican Big Boll	1	27	19	23	41	28	35
	2	26	20	23	36	39	38
	3	27	21	24	29	41	35
	4	30	27	29	28	36	32
	5	38	28	--	--	36	--
	6	--	27	--	--	25	--
Weighted av.[1]		29	23	26	30	37	34
Cook 1006	1	21	47	34	37	43	40
	2	21	40	31	36	44	40
	3	19	42	31	35	44	40
	4	25	35	30	35	44	40
	5	23	31	27	34	43	38
	6	--	35	--	--	42	--
Weighted av.		22	39	31	35	44	40
Clevewilt Strain 5	1	22	43	33	44	54	49
	2	32	46	39	45	57	51
	3	31	46	39	42	43	43
	4	30	47	39	32	39	36
	5	34	46	40	34	43	39
	6	--	47	--	--	39	--
Weighted av.		31	46	39	42	47	45
Stoneville 5 A	1	30	43	37	40	37	39
	2	33	43	38	39	44	42
	3	29	44	37	34	47	41
	4	29	45	37	30	47	39
	5	30	41	36	32	50	41
	6	--	42	--	--	51	--
Weighted av.		30	44	37	35	46	41

[1] Weighted on basis of number of bolls occurring in each period.