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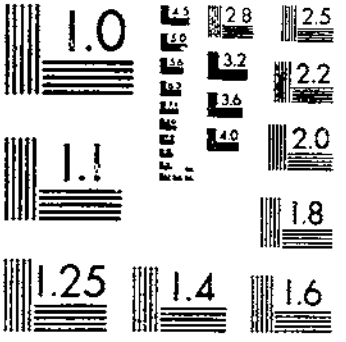

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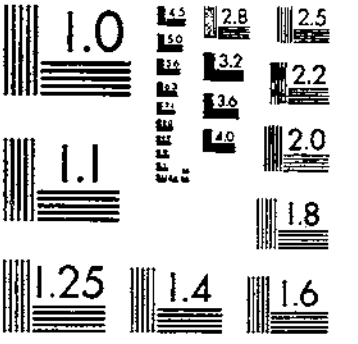

MICROCOPY RESOLUTION TEST CHART
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BOLL, FIBER, AND SPINNING PROPERTIES OF COTTON

as Affected by Management Practices

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Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE
in cooperation with
Alabama and Arizona
Agricultural Experiment Stations

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BOLL, FIBER, AND SPINNING PROPERTIES OF COTTON

as Affected by Management Practices

By O. L. BENNETT, *research soil scientist*, L. J. ERIE, *agricultural engineer*, and A. J. MACKENZIE, *research soil scientist, Soil and Water Conservation Research Division, Agricultural Research Service*

Quality of cotton is important to both the farmer and the textile industry. Fiber quality is a major factor in determining the price premium or discount the farmer will receive for his cotton. The manufacturer of cotton fabrics must know the fiber quality at time of purchase to enable him to make quality products and meet competition. To meet competition, a textile industry must have cotton fibers that can be processed at high speed with a minimum of stops. A farmer must be able to achieve a high degree of efficiency in cotton production for his operation to be profitable. To do this, he must use intensive management practices to produce profitable yields of high-quality fiber.

In the past, cotton has been bought on the basis of grade and staple length. Now most textile manufacturers set exact standards for fiber properties such as staple length, uniformity, strength, fineness, resilience, shape of fiber, and surface area of fiber. Improvements in automation of fiber testing have made it possible to obtain reliable information on most fiber-quality properties at a very low cost (*9*).[1] Thus, in the future, buyers will purchase cotton on the basis of more exacting quality requirements. Therefore, it will be of interest to both the farmer and the manufacturer to be able to predict the fiber properties of cotton when grown under various management practices.

REVIEW OF LITERATURE

Since 1915 attempts have been made to determine the effects of various management practices on fiber quality of cotton. In that year, Balls (*3*) conducted studies on the development and properties of raw cotton. He concluded that any condition that noticeably modified the physiological functions of the plant might affect the length and strength of fibers. In certain irrigation studies, he found that a deficiency in soil moisture for a 23-day period immediately after flowering was associated with a shortening of fiber length.

[1] Italic numbers in parentheses refer to Literature Cited, p. 37.

Armstrong and Bennett (*1*) in 1933 found no significant difference in length of fiber from plants grown on poor vs. fertile soil for the same variety. They also found that fiber from late-maturing bolls was shorter than that from earlier maturing bolls.

The results of early studies to show the effects of added fertilizers on boll and fiber properties were inconsistent. Reynolds and Killough (*28*) and Pope (*27*) found that fiber properties were not affected by fertilizers at rates used. They did find that variations in climatic conditions significantly altered various boll and fiber properties. The effect of seasonal variations on fiber properties was also observed by Moore (*22*).

Studies to determine the effect of individual fertilizer elements on boll and fiber properties have shown that applications of nitrogen usually increased boll size, seed size, seed index, fiber length, and percentage of elongation; but decreased lint percentage and sometimes fiber strength (*5, 7, 10, 14, 25, 29, 36*). Other workers found no effect of nitrogen on lint quality (*21, 24*). The effect of phosphorus was usually limited to an increase in boll size (*25*). Applications of potassium improved boll, fiber, and spinning properties, especially if cotton was grown on K-deficient soil (*6, 19, 23, 25*). These workers found that most of the increase was obtained with the first 50 pounds of added K. The additions of K increased boll size, seed size, seed index, lint index, fiber length, and fiber strength and improved spinning quality (*25*). Sodium had no effect on boll and fiber properties as long as sufficient K was present for normal growth (*19*). Most research indicates that proper fertilization is necessary for good boll, fiber, and spinning quality. However, certain studies have indicated that fiber properties are not affected by fertilizer applications (*24, 27, 28*).

Hancock, MacKenzie, and Moore (*17, 21, 22*) found that, under a given set of environmental conditions, the effect of variety is usually the dominant factor in determining boll and fiber properties. The same variety has been found to act differently in different locations (*27*). This usually can be explained on the basis of variations in climatic conditions, especially rainfall, relative humidity, and temperature (*2, 15, 17, 18*).

Any factor that caused premature termination of fruit or plant growth usually affected boll and fiber properties (*12, 35*). Tharp and coworkers (*35*) found that the most consistent, and proportionately the largest, influence of defoliation-induced immaturity was an increased fineness of fiber and decreased oil content. The increased fiber fineness was reflected in spinning properties as an increase in neps and waste. There is some evidence (*4, 26*) that topping or pruning of cotton plants may alter fiber properties. Heavy infestation of boll weevils did not affect fiber properties (*20*).

Most research data indicate that bolls from the top of the plant give lower values for boll size and fiber length but higher values for lint percentage and fineness than bolls produced on the lower part of the plant (*15*). Several workers (*2, 16, 27*) have reported differences in fiber properties caused by differences in climatic conditions at time bolls were set and fibers were maturing.

Earlier studies (*16, 28*) indicate that fiber properties, especially

length, were affected by high and low rainfall, with longest fibers associated with high rainfall. These observations have been substantiated by more recent research studies (*5, 7, 8, 11, 13, 29, 30, 31, 32, 33, 34*) that indicate that irrigation usually increases fiber length, boll size, seed size, lint index, and seed index and produces a more mature fiber. Results from other studies indicate little or no effect on fiber properties (*14*). Excess irrigation usually decreases fiber strength and lint percentage (*5, 7, 29*). Spooner and coworkers (*30, 31*) found that proper irrigation does not lower fiber quality, but instead it stabilizes and usually improves fiber quality. Most data indicate that proper fertilization with irrigation is necessary for good fiber quality.

During more recent years, experiments under intensive management have afforded an opportunity for a more detailed appraisal of the effects of various management practices on boll, fiber, and spinning properties. Also, better methods of measuring fiber-quality factors now make possible a more detailed evaluation of the effect of management and environment on these factors.

This bulletin brings together information on boll, fiber, and spinning properties of cotton from research studies conducted under intensive management at locations having a wide range in soil and climatic conditions. This information is needed to be able to predict the boll, fiber, and spinning properties of cotton when grown under various management practices at different locations and under different climatic conditions.

EXPERIMENTAL PROCEDURES AND METHODS OF DETERMINATION OF COTTON PROPERTIES

Field experiments to determine the effects of various management practices on yield and fiber quality of cotton were conducted at Thorsby, Ala. (humid region), from 1956 through 1962; at Tempe, Ariz. (arid region), from 1954 through 1962; and at Brawley, Calif. (desert region), from 1951 through 1960. The soils ranged in texture from a fine sandy loam to a heavy clay loam. The annual rainfall averaged 2.4 inches at Brawley, Calif., 9.0 at Tempe, Ariz., and 56 inches at Thorsby, Ala.

All experiments were on irrigated cotton except for experiments in Alabama involving moisture variables.

Alabama experiments included studies on the effects of soil moisture regimes, rates of nitrogen, and rates of K; studies on the interaction of rates of N and K; plant-topping studies with eight varieties of cotton grown under high-fertility conditions; studies on effects of height of plant topping with and without side-branch pruning when cotton was grown under high fertilization; and varietal studies on cotton grown under high fertilization.

Studies in Arizona were directed mainly toward determining the proper application of water for maximum lint production and fiber quality of cotton. Fiber-quality measurements were made from cotton that developed from fruit that flowered during the same week.

At Brawley, Calif., yield and boll and fiber quality of cotton were evaluated as influenced by soil moisture, nitrogen rates, and time of nitrogen application.

Experimental Procedures

Data from all three locations were analyzed statistically by analysis of variance. Duncan's multiple range test was used to indicate significant differences. Lower-case letters after means are used to designate significant differences. Any two values within a column and averages between columns not followed by the same letter or letters are significantly different at the 5-percent probability level.

Alabama.—All studies reported were conducted on either Greenville fine sandy loam or Faceville sandy loam soil with a slope of less than 1 percent. Available-water-holding capacity averages approximately 1.20 inches per foot of soil.

Experimental designs used for the six field experiments conducted at Thorsby, Ala., were randomized block and split-plot. Cotton was planted in 40-inch rows between April 10 and 20 each year and thinned to a population of two to three plants per foot. Four replications were used in all studies. Plot width ranged from four to seven rows and length ranged from 20 to 60 feet.

In experiments not involving moisture variables, irrigation was applied uniformly to all plots, usually when 50 percent of the available water was depleted in the surface 24 inches of soil. Soil moisture was determined gravimetrically by sampling at 6-inch increments. All irrigation was applied by the furrow method.

Frequent applications of insecticides were made throughout the growing season to control boll weevils and other insects.

Experimental areas usually received a broadcast application of limestone, N, P, and K before planting, unless rates of the fertilizer elements were used as variables. When N and K were used as variables, they were applied broadcast by hand as follows: 25 pounds at planting and the rest split equally and applied 30 and 60 days after planting. Ammonium nitrate, superphosphate, and muriate of potash were used as sources of N–P–K in all studies.

A minor element mixture consisting of B, Cu, Zn, Mn, and Mo was applied annually to all experimental areas. The soil in experimental areas for most studies was fumigated with ethylene dibromide to control nematodes before planting.

Yields were determined from the two inside rows on 4-row plots and from the five inside rows on 7-row plots. All plots were hand-picked four to five times each year, and a 100-boll sample was obtained from each plot at the time of each picking to determine boll and fiber properties. All fiber properties were determined by the U.S. Cotton Fiber Laboratory, Knoxville, Tenn.

Arizona.—Research studies were conducted on an Adelanto clay loam soil with an available-water-holding capacity of approximately 1.75 inches per foot. Soils are calcareous and predominantly loams to silty clay loams, low in organic matter, and require high applications of nitrogen fertilizer for good cotton production. Subsoils are usually quite permeable. Summertime temperatures occasionally reach 120°, with an average maximum near 105° F. during July and August. Relative humidity seldom exceeds 45 percent and is usually down to 5 percent during daytime.

Cotton was usually seeded the first week of April on beds spaced 40 inches apart and thinned to a population of two plants per foot,

TABLE 1.—*Average percentage soil moisture depletion from the top 3 feet at time of irrigation for the 3 soil moisture regimes, by years, Tempe, Ariz., 1958–62*

Year	Average soil moisture depletion with soil moisture regime of—		
	Wet	Medium	Dry
	Percent	*Percent*	*Percent*
1958	----------	68	91
1959	40	60	----------
1960	51	68	87
1961	59	76	89
1962	49	62	----------

4 to 5 weeks after planting. Five replications of irrigation treatments were randomized, and each plot was irrigated separately. Plots were four rows wide and ranged from 300 to 600 feet in length.

Three soil moisture regimes were used for any one year to represent a wet, a medium, and a dry soil moisture regime when possible (table 1). The various plots were irrigated on the basis of gravimetric soil sampling in the top 3 feet of soil. However, soil-moisture determinations were made through 6 feet of soil by sampling at 1-foot increments. Irrigation was applied when 50 to 90 percent of the available soil moisture was depleted; the percentage depended on the soil moisture regime used. The number of irrigations ranged from three to seven; the plants received a seasonal application of 30 to 45 inches of water. A preplant irrigation was always given and minimum tillage practiced. Irrigation water was applied by the furrow method in sufficient quantities to restore the root-zone moisture to field capacity. Irrigation water contained approximately 1,000 p.p.m. of salt.

Flowers were tagged each day throughout the productive flowering period in areas selected within the irrigated treatments. Bolls of cotton picked from previously tagged flowers were used for boll and lint quality measurements. Cotton from bolls derived from the tagged flowers was processed for 1-day periods for boll and lint quality, then the data were combined to represent 1-week periods. Fiber measurements were made at the University of Arizona, Tucson, Ariz. Table 2 gives the calendar dates for the weekly flower production periods. All boll and fiber property data represent the means of at least three and not more than six samples.

California.—The surface textures of the soils on which tests were conducted are fairly uniform, being dominantly silty clay loam or silty clay. The subsoils are highly variable, slowly permeable and stratified, but in general coarsely textured as is characteristic of the Holtville series.

The soils within the area are alluvial and are composed of highly stratified Colorado River deposits, largely from mixed sedimentary rock material. They are calcareous soils and are inherently low in organic matter and nitrogen. Plant nutrients, other than nitrogen,

TABLE 2.—*Calendar days included in the 12 weekly flowering periods, Tempe, Ariz.*

Weekly flowering period, No.	Calendar days each year	Weekly flowering period, No.	Calendar days each year
1	6/22–6/28	7	8/3–8/9
2	6/29–7/5	8	8/10–8/16
3	7/6–7/12	9	8/17–8/23
4	7/13–7/19	10	8/24–8/30
5	7/20–7/26	11	8/31–9/6
6	7/27–8/2	12	9/7–9/13

needed for good cotton production are adequately supplied by the soil.

The cotton varieties used in these experiments were seeded in early April in beds spaced 40 inches apart. The plant stand was thinned to a population of two to four plants per foot 4 to 5 weeks after emergence. Experimental designs used were randomized block and split-plot, with a minimum of four replications for each treatment. The plots were six and eight rows wide, respectively. Length of plots ranged from 30 to 50 feet. Yields of seed cotton as well as all samples for fiber analysis were obtained by hand-picking the four inside rows of each plot in September and December.

When soil moisture variables were not involved, ample irrigation water was provided during the season. In general, the cotton crops were irrigated when 50 percent of the available soil moisture had been depleted from the surface 24 inches of soil. Each crop received a seasonal application of 36 to 42 inches of water in approximately 13 irrigations. All irrigation water was applied by the furrow method.

In soil moisture experiments, irrigation frequencies for the various treatments were determined by the use of instruments (i.e., tensiometers, gypsum blocks, and neutron soil moisture meters). The available moisture content of the surface 24 inches of soil, from which soil moisture was most rapidly depleted by the crop, was used for establishing the treatments.

Ammonium nitrate was the principal source of nitrogen used; however, aqueous ammonia (20 percent N) was used in some experiments. Whenever time of nitrogen application was not a variable, one-third of the nitrogen was applied preplant and the remaining two-thirds was sidedressed after thinning (about June 1). Late applications of nitrogen scheduled for midseason or late season were distributed in the furrows by hand and watered in by immediate irrigation. Treble superphosphate was broadcast at the rate of 35 pounds P per acre, before planting, on all experimental areas.

Data other than yield were obtained from a 150-boll sample picked by hand just before each harvest. Treatment effects on boll and fiber properties reported are the averages of these samples. Fiber properties were measured at the fiber laboratory of the U.S. Cotton Field Station at Shafter, Calif., and spinning properties were determined by the spinning laboratory of the U.S. Cotton Field Station at Knoxville, Tenn.

Methods of Determination of Cotton Properties

Boll Properties

Boll Size.- Number of bolls of seed cotton required to produce 1 pound or expressed as weight per boll in grams.

Lint Percentage.- Weight of lint ginned from a sample (usually 100 to 150 bolls) of seed cotton, expressed as a percentage of the weight of seed cotton.

Lint Index. Weight, in grams, of lint from 100 seed.

Seed Index.- Weight of 100 seed, expressed in grams.

Seed Per Boll.- Average number of seed contained in one boll of cotton.

Fiber Properties

Mean Length.- Average length, in inches, of all fibers longer than ¼ inch.

Upper Half Mean Length.- Length, in inches, of the half of the fibers by weight that contain the longer fibers. This value is an approximation of classifiers staple.

Uniformity.- Ratio of mean length to upper half mean length, expressed in percentage.

Fiber Strength (T_0).- Fiber strength of a bundle of fibers measured on a stelometer with the two jaws holding the fiber bundle tightly appressed. Strength expressed in terms of grams per grex or Pressley index.

Fiber Strength (T_1).- Fiber strength of bundle of fibers measured on a stelometer with two jaws holding the fiber bundle separated by an ⅛-inch spacer. Strength expressed in terms of grams per grex or Pressley index.

Fiber Elongation (E_0).- Percentage of elongation at break of the fiber bundle measure for (T_0) strength on the stelometer.

Fiber Elongation (E_1).- Percentage of elongation at break of the center ⅛ inch of the fiber bundle measured for T_1 strength on the stelometer.

Micronaire.- Fineness of the sample taken from ginned lint measured by the micronaire and expressed in standard (curvilinear scale) micronaire units.

External Surface Area "A".- Measure of external surface area of fibers of a given volume of fibrous material, expressed in terms of square millimeters per cubic millimeter of fibrous material.

Fiber Flatness "D".- Difference between value of specific area determined at high pressure (AH) and value of specific area determined at standard pressure (A). "D" is presumably a measure of flatness of fibers; the higher the "D" value, the more ribonlike are the fibers.

Spinning Properties

Yarn Strength (22's). Yarn strength of 22's (actually 27 tex) as determined from small-scale (50 grams) test.

Neps.- Carded 4½ pounds per hour.

RESULTS AND DISCUSSION

Data have been summarized according to moisture, fertility, variety, and management variable effects on the various boll, fiber, and spinning properties of cotton.

YIELDS

Yield data are included to aid in evaluating effects of various management practices on boll, fiber, and spinning properties of cotton. Yield data are reported in appendix tables 3 to 8 for Thorsby, Ala.; in appendix table 9 for Tempe, Ariz.; and in appendix tables 10 to 12 for Brawley, Calif. Figures 1 to 3 show the percentage of total lint production by weeks throughout the flowering season for the data from Tempe, Ariz. In Arizona and California, a distinct low-flowering period referred to as "cutout" occurs in August; however, no distinct "cutout" is noticed under irrigated conditions in Alabama.

Alabama

Yields were increased by N applications through 360 pounds per acre (app. table 3); by rate of K application through 500 pounds per acre (app. tables 4 and 5); by topping plants of weak-stem varieties at height of 48 inches (app. table 6); and by topping plants at 36, 42, or 48 inches, with or without side-branch pruning (app. table 7). Irrigation increased yields in all tests (app. table 3). Yield differences as a result of variety were found in a 4-year period (app. tables 6 and 8).

Arizona

Yields of lint for Acala 44, Pima S-1, and Deltapine Smooth Leaf varieties were increased by increasing available soil moisture level during each year except 1959 for Acala 44 and 1961 for Deltapine Smooth Leaf (app. table 9). Plants of Acala 44 under the wet moisture regime produced 69 percent of their fruit-producing blossoms between July 6 and August 9 (third through seventh flowering week) and 81 percent by August 9 (fig. 1). Plants under the medium moisture regime produced 74 percent of their fruit-producing blossoms by August 16 (eighth flowering week), and plants under the dry regime produced only 67 percent of their fruit-producing blossoms by the same date. For Deltapine Smooth Leaf (fig. 2), 84 percent of its fruit-producing blossoms opened by July 26 (fifth flowering week) under the wet moisture regime, 60 percent under the medium, and 59 percent under the dry moisture regime. When the results from the wet and dry soil moisture regimes for Pima S-1 were averaged, approximately one-third of its fruit-producing blossoms opened during the second, third, and fourth weeks of the blossoming period and about 60 percent during the last 3 weeks of the blossoming period (fig. 3).

California

Yield responses were obtained from rate of N application (app. table 10) and from soil moisture variables (app. table 12). Nitrogen treatments increased yields of lint up to about 750 pounds per acre over the no-nitrogen treatment. Soil moisture variables caused differences in yield from 200 to 900 pounds per acre. No yield differences due to timing of N applications were found (app. table 11).

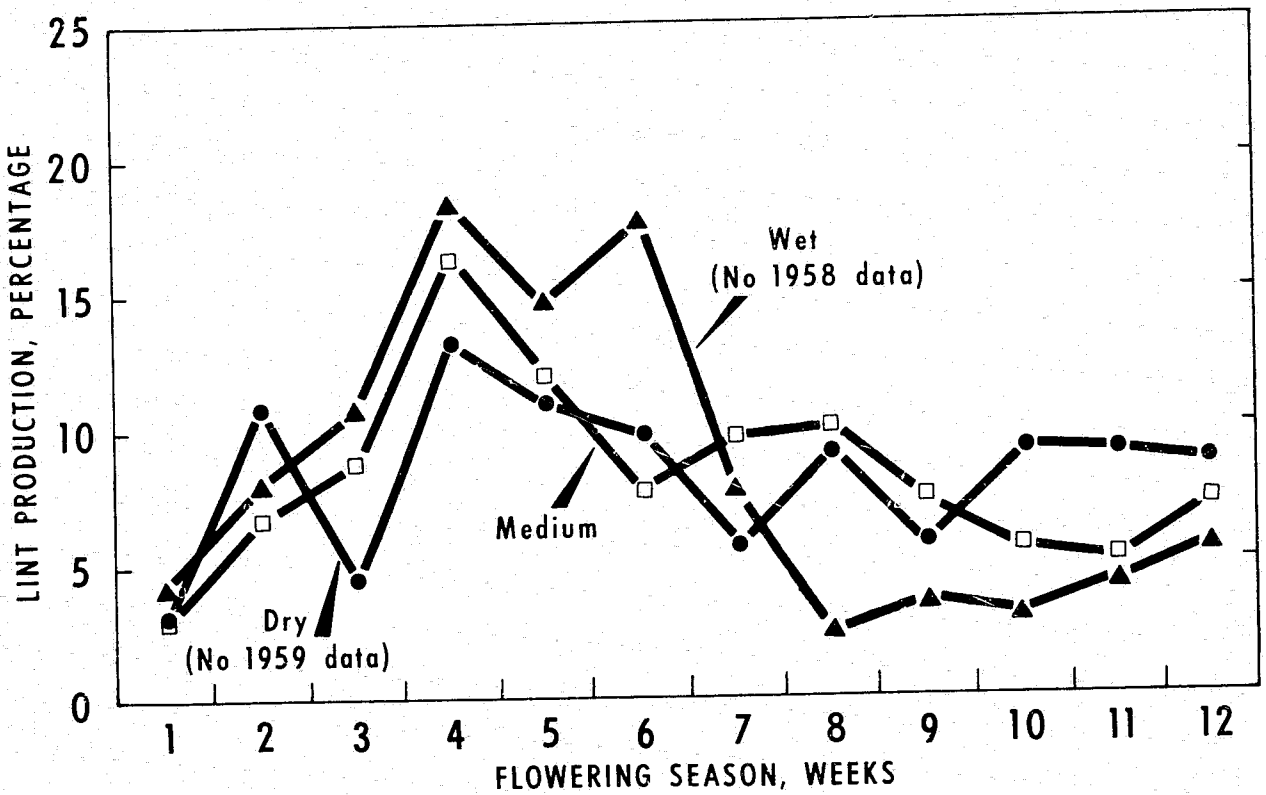

FIGURE 1.—Mean percentage of total lint yield produced by Acala 44 variety from bolls set during weekly flowering periods, as affected by soil moisture regime at Tempe, Ariz. (Average 1958, 1959, 1960, and 1961.)

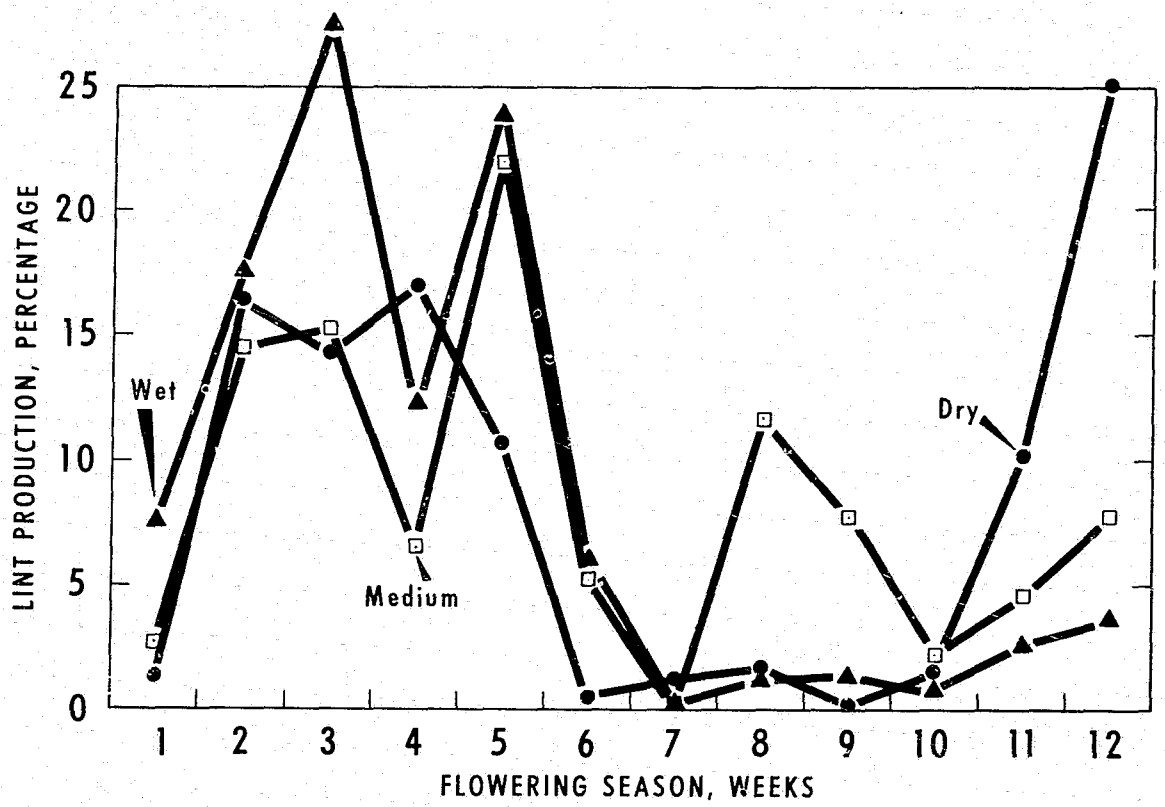

FIGURE 2.—Mean percentage of total lint yield produced by Deltapine Smooth Leaf variety from bolls set during weekly flowering periods, as affected by soil moisture regime at Tempe, Ariz. (Average 1958, 1959, 1960, and 1961.)

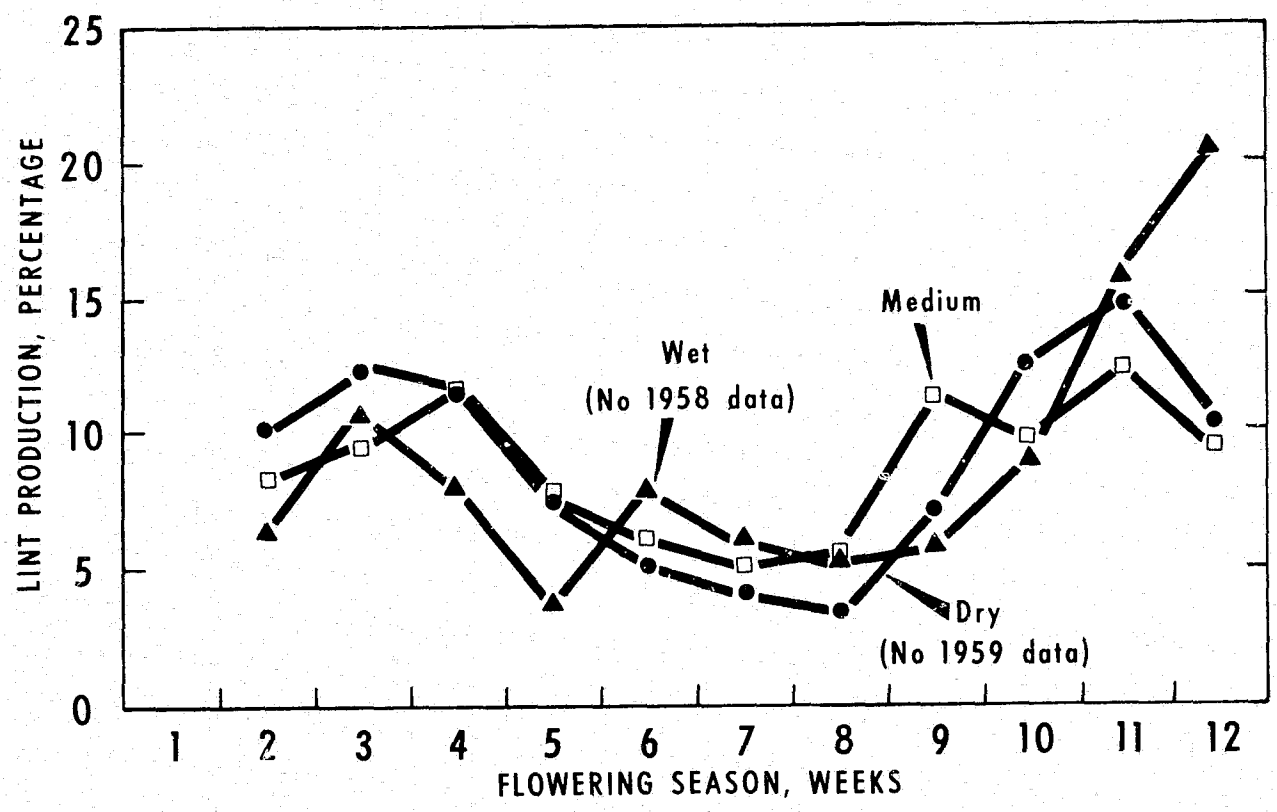

FIGURE 3.—Mean percentage of total lint yield produced by Pima S–1 variety from bolls set during weekly flowering periods, as affected by soil moisture regime at Tempe, Ariz. (Average 1958, 1959, 1960, and 1961.)

Boll Properties

Lint Percentage

Alabama

Lint percentage decreased as rates of N application and soil moisture level were increased (fig. 4). Potassium applications usually decreased the lint percentage of irrigated cotton (fig. 4). In studies where combinations of rates of N and K applications were used, lint

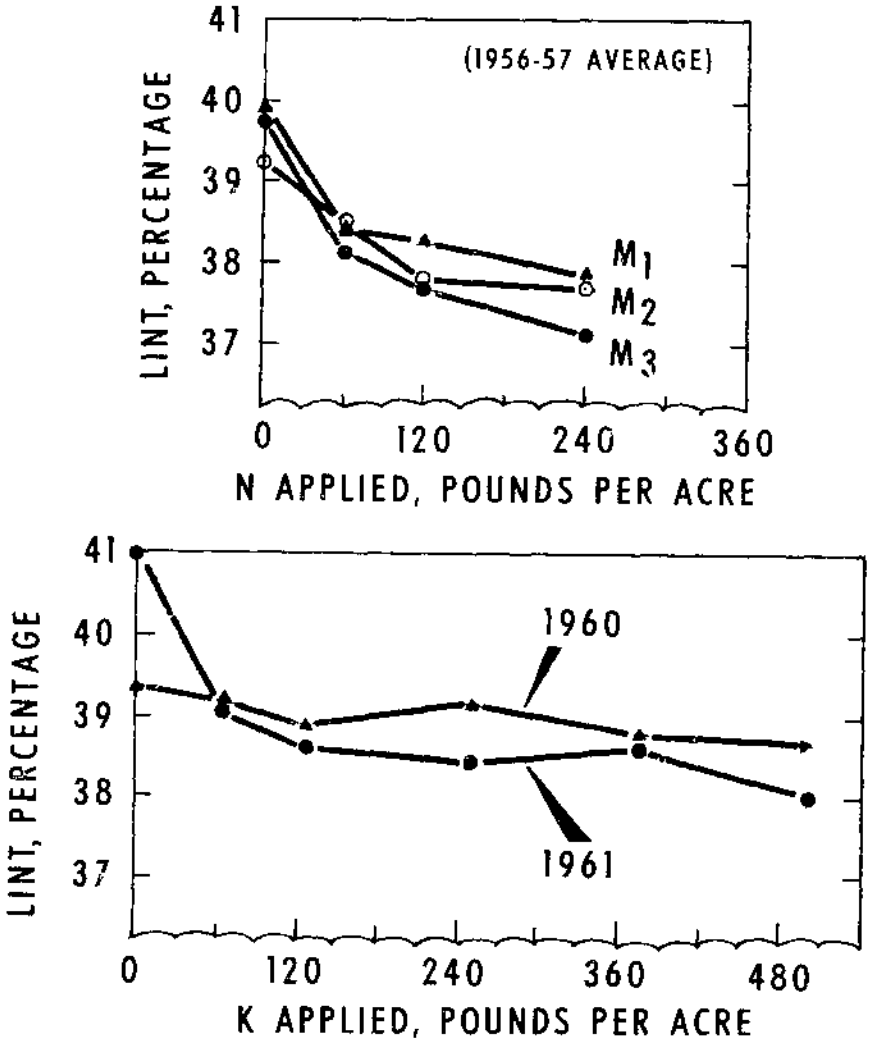

FIGURE 4.—Lint percentage as affected by rate of N application × soil moisture level (top) and by rate of K application (bottom). M_1, no irrigation; M_2 and M_3, irrigated when 65 and 35 percent, respectively, of available soil moisture was depleted from top 24 inches of soil.

percentage was affected in a manner similar to that when each was used alone (app. table 13).

Topping at a height of 48 inches increased the lint percentage for most of the eight varieties tested (app. table 14). Topping strong-stem varieties, such as Acala 44 and Stardel, did not affect lint percentage. Topping Auburn 56 variety at heights of 36, 42, and 48 inches and side-branch pruning slightly increased the lint percentage (app. table 15)

Varietal differences in lint percentage amounted to as much as 4 percent (app. table 16).

Arizona

There was a 1-percent significant difference in lint percentage for the soil moisture regimes in 1 of 4 years for Acala 44 and 2 of 3 years for Pima S 1, but no difference for Deltapine Smooth Leaf (app. table 17 and figs. 5 and 6). In 1961 Acala 44 had the highest lint percentage when subjected to the driest moisture regime. In 1958, for Pima S 1, only medium and dry regimes were tested. In 1959, medium and wet regimes were tested. Lint percentages were highest for the medium regime in both years.

Lint percentage for all varieties tested varied according to week of flowering bolls and was highest from bolls set during peak production periods (fig. 6).

The average weekly lint percentage for the test years was 36 percent for Acala 44, 37.9 percent for Deltapine Smooth Leaf, and 32 percent for Pima S-1. The mean yearly lint percentage varied less than 5 percent for Acala 44 and Deltapine Smooth Leaf. Pima S-1 showed differences of over 10 percent.

California

Rate of N application affected lint percentage in 5 of the 15 tests conducted during the 1951 to 1960 period. In these few tests, the effect was not consistent and both increases and decreases resulted when rates of N were applied. The lint percentages of four varieties (app. table 18) grown in 1959 and 1960 showed little change over a wide range of N rates. Differences in timing of the N applications for the 240-pound per-acre level (app. table 19) resulted in small and inconsistent changes in lint percentage. Timing of application for lower levels of N (40 and 80 pounds per acre) had no effect on lint percentage.

A dry soil moisture regime throughout the season increased lint percentage in only two of seven tests (app. table 20). Other differences were evident where the soil moisture regime varied during the season, but these results were not the same when the tests were repeated the following year (1958-1 and 1959-2).[1]

Lint Index

Alabama

Soil moisture level had no consistent effect on lint index (app. table 21). Lint index tended to be reduced by N applications at all moisture levels.

[1] Numbers after the years refer to experiment numbers.

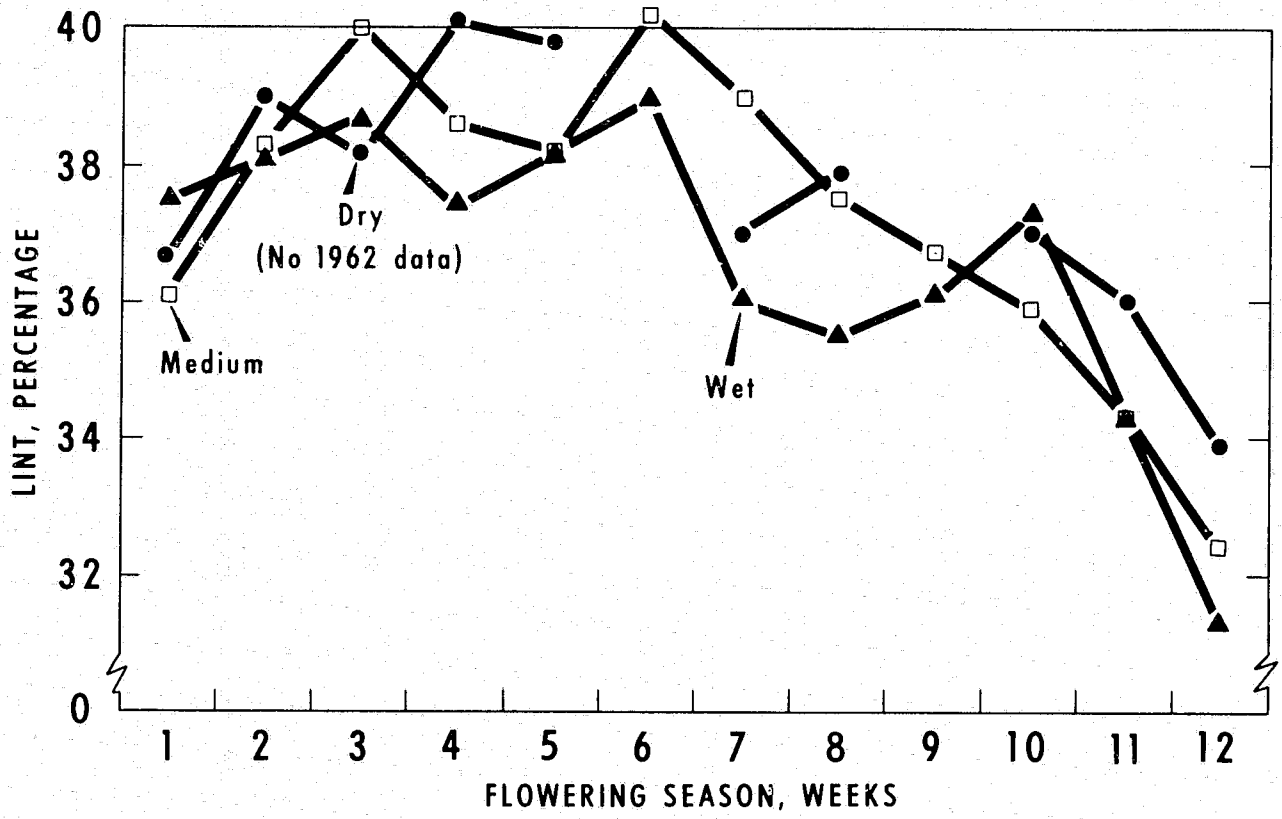

FIGURE 5.—Mean lint percentage for Deltapine Smooth Leaf cotton, as affected by soil moisture, Tempe, Ariz. (1961, 1962)

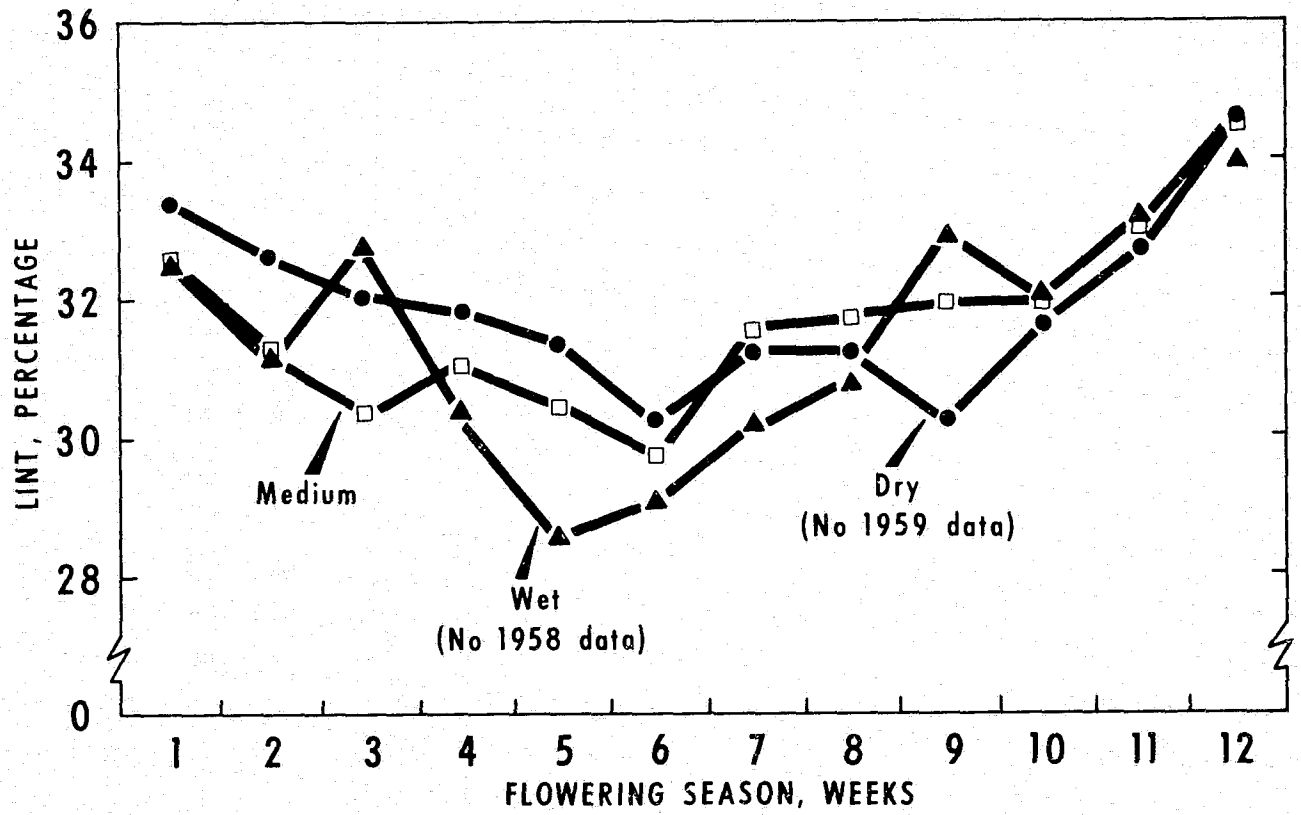

FIGURE 6.—Mean lint percentage for Pima S–1 cotton, as affected by soil moisture, Tempe, Ariz. (1958, 1959, and 1960)

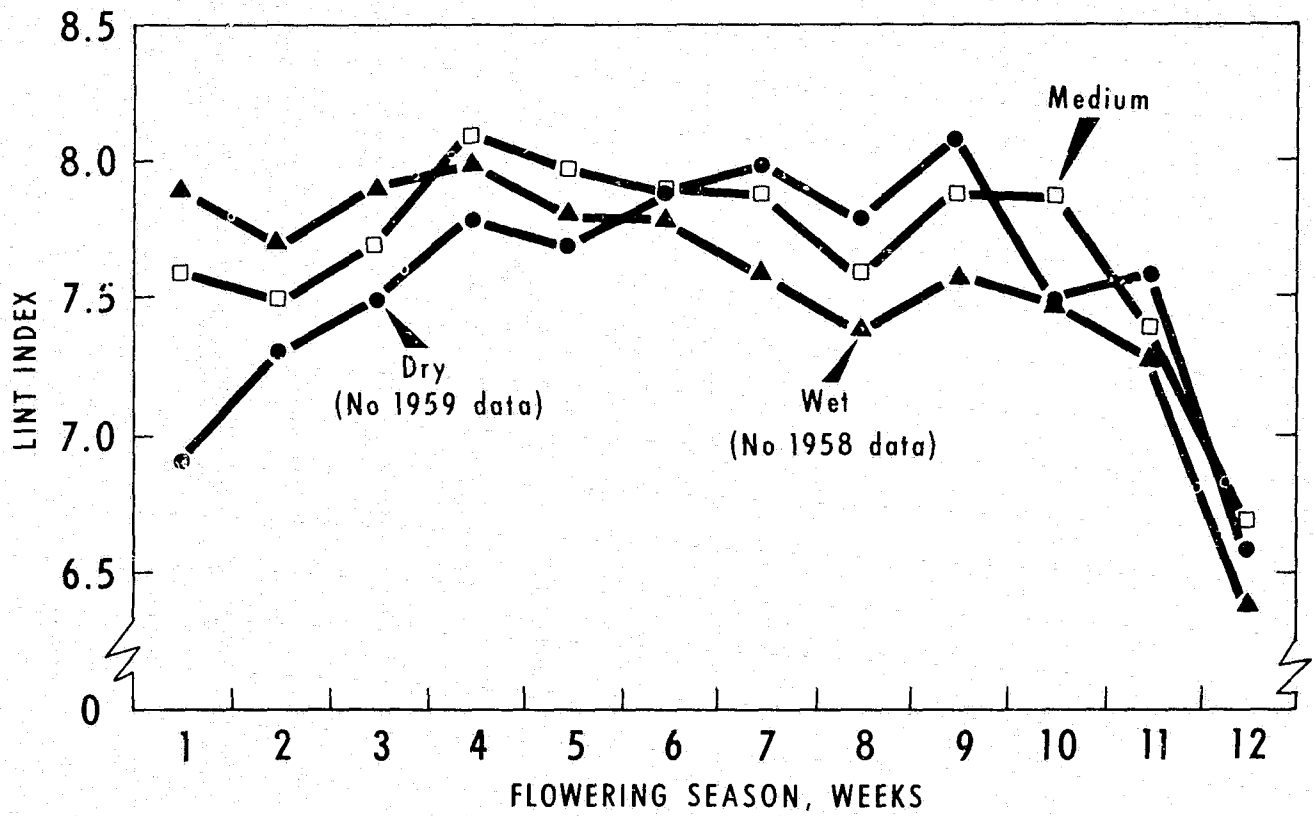

FIGURE 7.—Mean lint index for Acala 44 cotton, as affected by soil moisture, Tempe, Ariz. (1958, 1959, 1960, and 1961)

Arizona

Lint index was lowest for the driest soil moisture regime in 2 of 4 years for Acala 44, in 1 of 2 years for Deltapine Smooth Leaf, and in 1 of 3 years for Pima S-1. In other years it was not affected. (App. tables 22 and 23.)

Lint index for all varieties tested varied according to week of flowering of bolls in all test years and was generally low for the bolls set during the last week of the flowering period. For Acala 44, the average weekly lint index increased for bolls set up to the fourth week of blossoming and remained high for those set during the 3 weeks of major fruiting (fig. 1); then, in general, it decreased for bolls set during the rest of the season, with a very significant drop for those set the last week of flowering (fig. 7).

The mean yearly lint index varied 8 percent for Acala 44, 5 percent for Deltapine Smooth Leaf, and 6 percent for Pima S-1.

California

Lint index was increased by N applications in 8 of the 15 rate-of-nitrogen tests (app. table 10). It was not affected by the added N in the other tests. The results of the 1959-1960 tests (app. table 18) show this effect to be similar for the four varieties used. Also it is seen that variety has a much greater effect on lint index than N treatment. The time of N applications for the most part had no effect on lint index (app. table 11). When application of a major part of the N was withheld until midsummer for the Acala 4-42 variety, lint index was reduced in 1 of 2 years.

Soil moisture regime affected lint index in four of the seven tests (app. table 24). In three of these four tests, it was decreased by withholding irrigation until the crop used a high percentage of the available soil moisture, but the opposite was true for the fourth.

Seed index

Alabama

Seed index was increased by the addition of N, but it was not affected by soil moisture level (app. table 25). Seed index usually decreased with successive picking dates.

Arizona

The seed index was highest with the medium soil moisture regime in 2 of 4 years for Acala 44 and in 1 of 2 years for Deltapine Smooth Leaf. In the other years, it was not affected by the soil moisture regime. The seed index was highest with the driest soil moisture regime in 1 of 3 years for Pima S-1 and not affected in the other years. (App. tables 26, 27, and 28.)

Seed index varied according to week of flowering of bolls for all treatments in all test years. For all varieties, it was generally low for bolls set during the last week of the flowering season.

The average weekly seed index for the test years was 13.5 for Acala 44, 9.6 for Deltapine Smooth Leaf, and 11.8 for Pima S-1 (app. tables 26, 27, and 28). The mean yearly seed index varied approximately 5 percent for Acala 44 and Deltapine Smooth Leaf. For Pima S-1, it varied over 13 percent.

California

Seed index was increased as the result of N additions in 10 of the 15 rate-of-nitrogen tests (app. table 10). Results of the 1959–60 tests (app. table 18) show that the four varieties were affected similarly. Variations in the timing of N applications generally did not affect seed index. When the available soil moisture decreased, the seed index decreased in all tests but one (app. table 29).

Boll Size

Alabama

Rate of N application and soil moisture level affected the size of bolls, with the largest boll being produced on plants receiving high rates of N and the most irrigation (fig. 8). Early-maturing bolls were

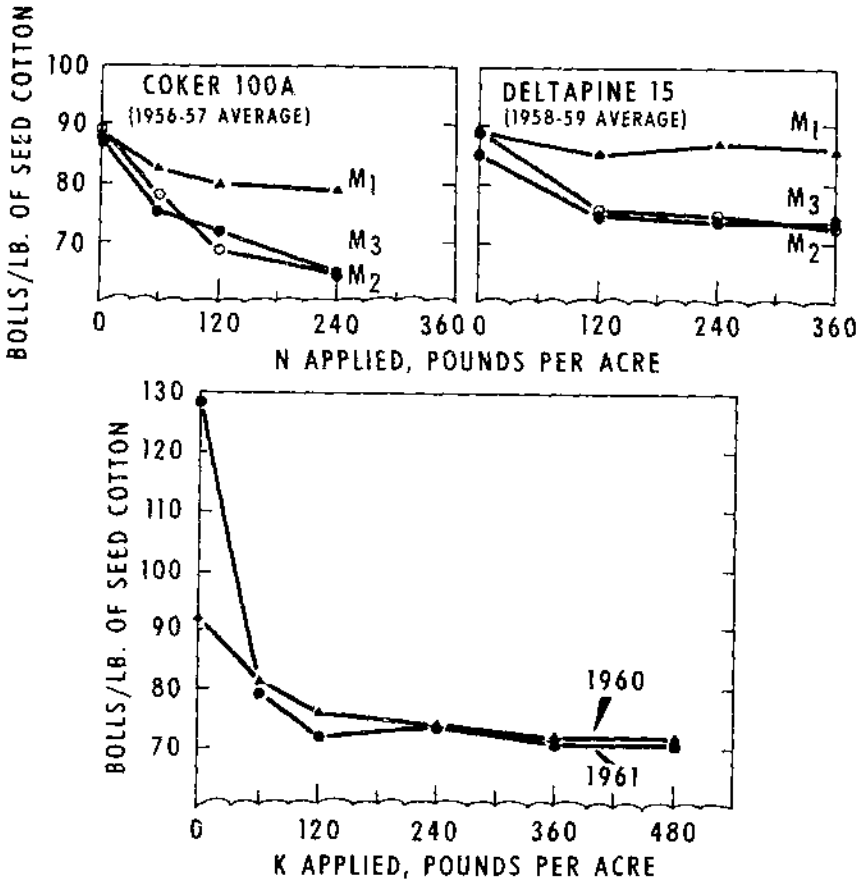

FIGURE 8.—Boll size as affected by rate of N application × soil moisture level (top) and by rate of K application (bottom). M_1, no irrigation; M_2 and M_3, irrigated when 65 and 35 percent, respectively, of available soil moisture was depleted from top 24 inches of soil.

always larger than late-maturing bolls, irrespective of rate of N application or soil moisture regime. Higher rates of K application increased boll size in most tests (fig. 8). Smallest bolls were found on plants showing extreme K deficiency symptoms. Boll size was not consistently affected by 120, 240, or 360 pounds of N in various combinations with 125, 250, and 500 pounds per acre of K.

Boll size of eight varieties was not consistently affected by topping plants at a height of 48 inches (app. table 30) nor that of Auburn 56 by topping plants at heights of 36, 42, and 48 inches, with and without side-branch pruning.

The greatest variation in boll size was the result of varietal differences (app. tables 30 and 31).

Arizona

Boll size was increased by the wettest soil moisture regime for all varieties in all test years, except in 1 of 2 years the soil moisture regime did not affect the size of bolls of Deltapine Smooth Leaf (figs. 9, 10, and 11).

Boll size varied according to week of flowering for all varieties and test years. The size of Acala 44 bolls was constant for bolls set the first 6 weeks of the flowering period, then gradually increased for those set until the end of the season, except for bolls from the dry soil moisture regime. Bolls from the dry moisture regime set the first and last weeks of the blossoming period were abnormally small (fig. 9). The boll size for Deltapine Smooth Leaf varied according to week of flowering, especially with the dry moisture regime (fig. 10). For Pima S-1, bolls set progressively later produced increasingly larger bolls (fig. 11). This period coincided with the highest production periods.

The average weekly boll size for Acala 44 was 6.4 grams, for Deltapine Smooth Leaf, 4.2 grams, and for Pima S-1, 2.7 grams. Mean yearly boll size measurements for Acala 44 and Pima S-1 varied as much as 12 percent. Differences for Deltapine Smooth Leaf were less than 5 percent.

California

Boll size was increased as the result of N additions in 10 of the 15 rate-of-nitrogen tests. The 1959-60 tests (app. table 18) show that N application increased the boll size of three of the four varieties by approximately 10 percent over the no-nitrogen treatment. Variations in the timing of N applications generally did not affect boll size unless a N deficiency existed during the major part of the fruiting period. Reductions in the supply of available soil moisture decreased boll size in all six tests (app. table 32).

Seeds Per Boll

Arizona

The wet soil moisture regimes usually increased the number of seeds per boll for Acala 44 and Pima S-1 varieties (app. tables 33 and 34). Seed per boll for both varieties varied according to week of flowering of bolls. Bolls set progressively later produced increasingly more seeds per boll. Seeds per boll varied over 20 percent between years for Pima S-1 and 13 percent for Acala 44.

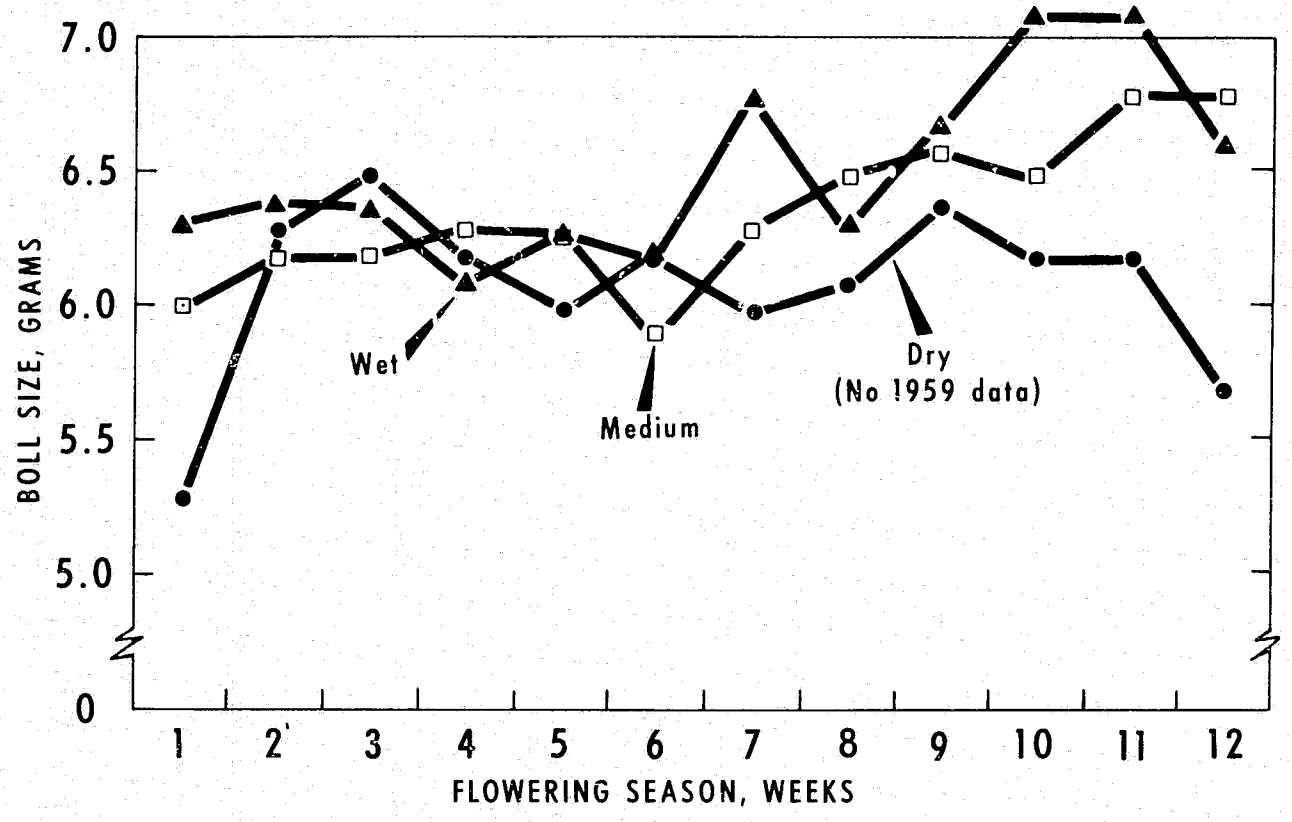

FIGURE 9.—Mean boll size for Acala 44 cotton, as affected by soil moisture, Tempe, Ariz. (1959, 1960, and 1961)

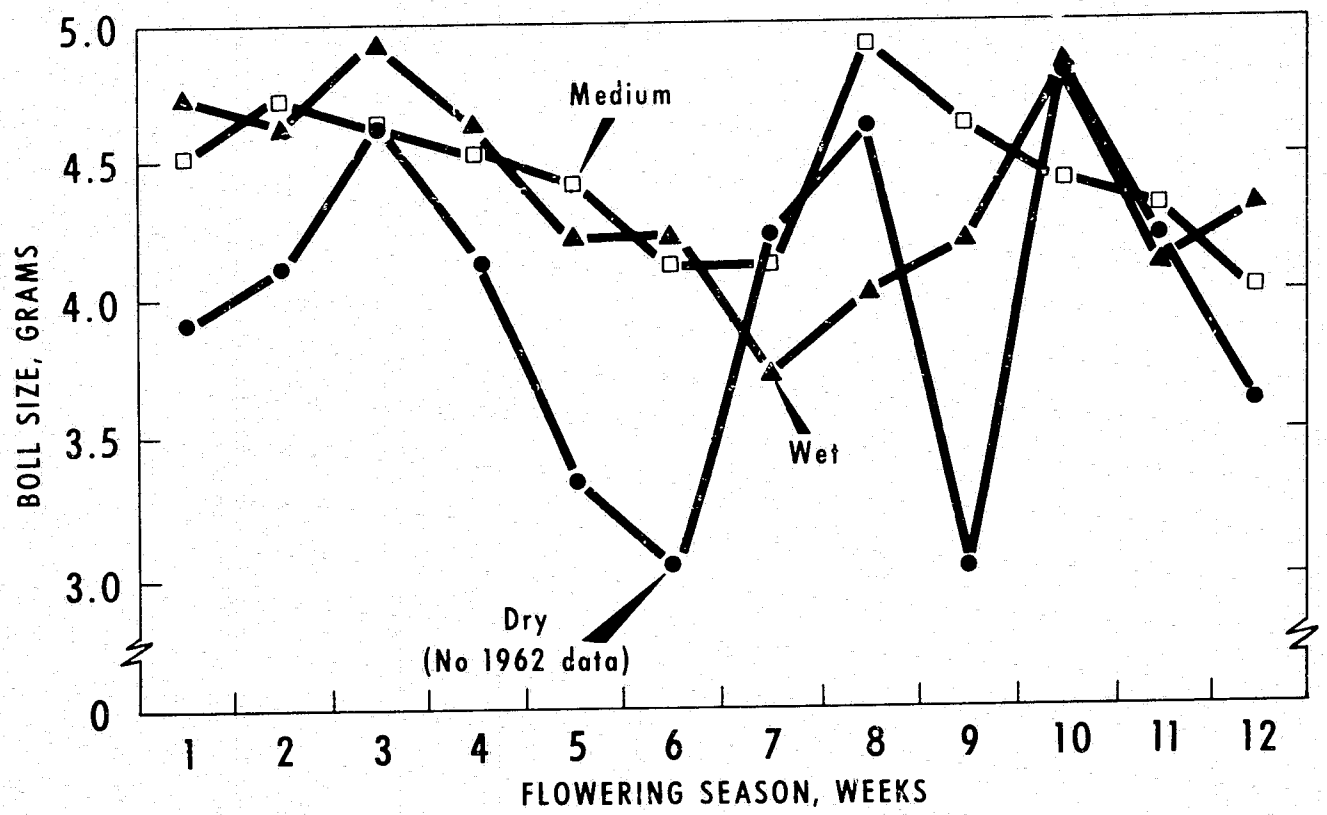

FIGURE 10.—Mean boll size for Deltapine Smooth Leaf cotton, as affected by soil moisture, Tempe, Ariz. (1961 and 1962)

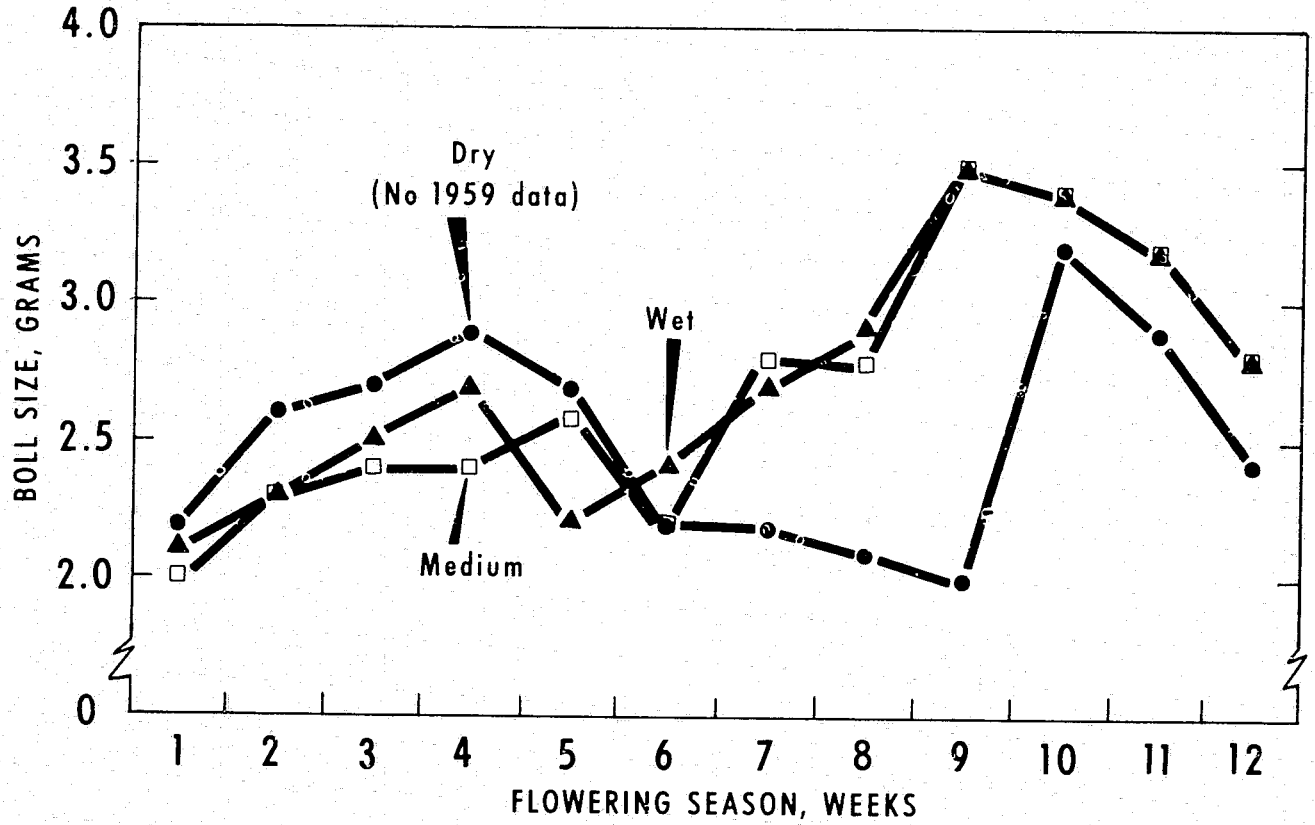

FIGURE 11.—Mean boll size for Pima S–1 cotton, as affected by soil moisture, Tempe, Ariz. (1959 and 1960)

California

In only one of the 1951–60 tests conducted was the number of seeds per boll affected by nitrogen rate. In this test nitrogen additions increased seeds per boll for the Acala 4–42 variety, but the following year nitrogen did not affect this character (table 18). Variations in timing of nitrogen applications had no effect. In four of six tests (table 35) a decrease in the available soil moisture reduced the number of seeds per boll.

Fiber Properties

Mean Fiber Length

Alabama

Moderate rates of N applications with irrigation generally increased mean fiber length of Coker 100A variety, but an increase was less pronounced with Deltapine 15 (fig. 12). An increase in available soil moisture increased mean fiber length in most tests. Mean fiber

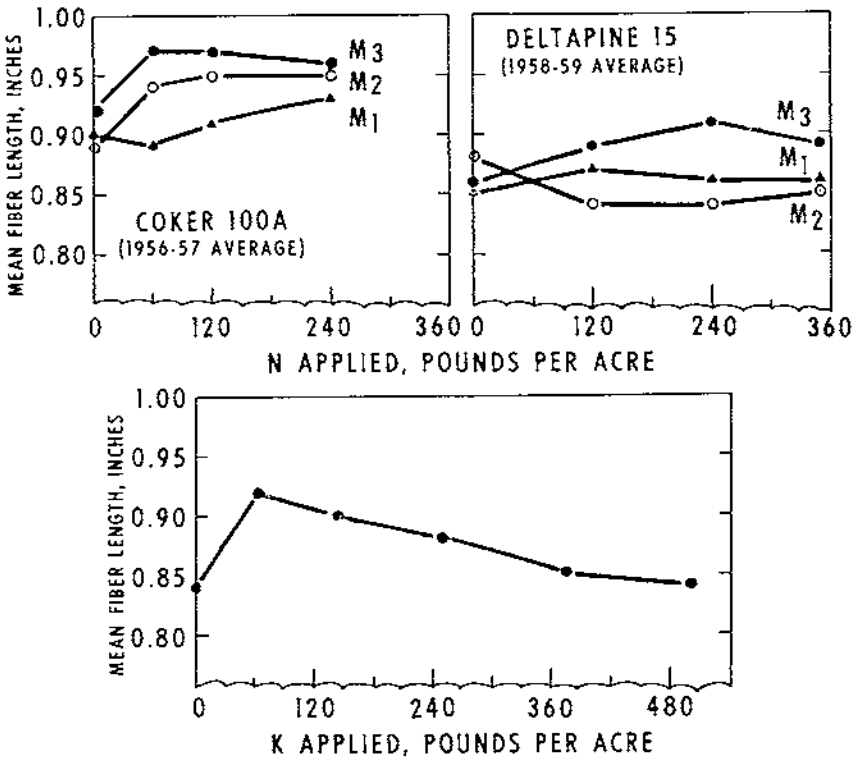

FIGURE 12.—Mean length of cotton fibers, as affected by rate of N application × moisture level (top) and by rate of K application (bottom). M_1, no irrigation; M_2 and M_3, irrigated when 65 and 35 percent, respectively, of the available soil moisture was depleted from top 24 inches of soil.

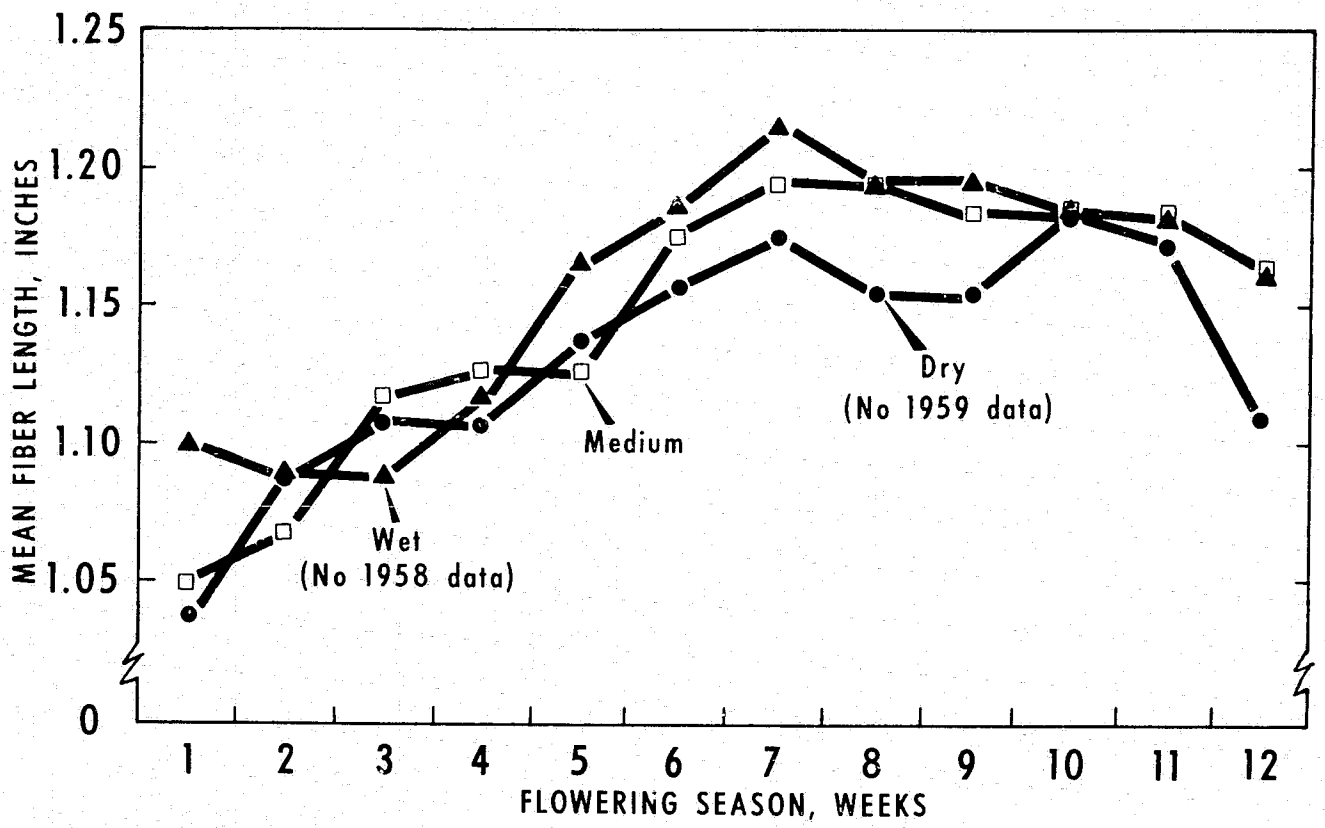

FIGURE 13.—Mean fiber length for Pima S–1 cotton, as affected by soil moisture, Tempe, Ariz. (1958, 1959, and 1960).

length was increased with the addition of up to 62.5 pounds of K per acre. Greater amounts of K produced a declining response in mean fiber length until 500 pounds per acre was equal to no K (fig. 12). Studies to determine the interaction effect of rates of N and K applications on fiber properties showed that mean length was not consistently affected as long as some N and K were applied (app. table 36).

Topping plants at 48 inches increased average mean fiber length of the eight varieties of cotton tested in 1960, but it had no effect in 1961 (app. table 37). Differences among varieties were found both years. Mean fiber length was affected by height of plant topping or by a combination of topping and side-branch pruning, especially for the first picking date each year (app. table 38). Considerable differences in mean fiber length were found between picking dates and between varieties in all tests on topping and side-branch pruning.

Arizona

Mean fiber length was not consistently affected by soil moisture regimes. Acala 44 had the longest fiber with the driest soil moisture regime in 2 of 4 years; however, Deltapine Smooth Leaf had the shortest fiber with this regime (app. table 39). In the other years these two varieties were not affected. In 1959 Pima S–1 had the shortest fiber with the driest soil moisture regime, but in 1960 it had the shortest with the wet moisture regime and the longest with the medium moisture regime.

Mean fiber length for all varieties varied according to week of flowering of bolls in all test years (fig. 13).

The average weekly mean fiber length for the test years was 0.789 inch for Acala 44, 0.711 inch for Deltapine Smooth Leaf, and 1.152 inch for Pima S–1.

California

Mean fiber length was not affected by rate or timing of N applications during the 10-year period 1951–60. The data (app. table 40) show that variety differences were far more important in producing variations in fiber length than was level of N fertilization. Variations in soil moisture regime affected mean fiber length in more than half of the tests (app. table 41). Length was reduced as available soil moisture was decreased.

Upper Half Mean Fiber Length

Alabama

Nitrogen applications usually increased upper half mean (UHM) length of cotton fibers, and irrigation always increased UHM fiber length (fig. 14). The longest fibers were produced by using a combination of high rates of N application with a high soil moisture level. The addition of up to 125 pounds of K per acre increased the UHM fiber length; higher rates of K reduced it (fig. 14). Various combinations of rates of N and K applied did not show any interaction effect on UHM fiber length. Maximum length was usually obtained by additions of 120 pounds per acre of N and 250 pounds per acre of K (app. table 36).

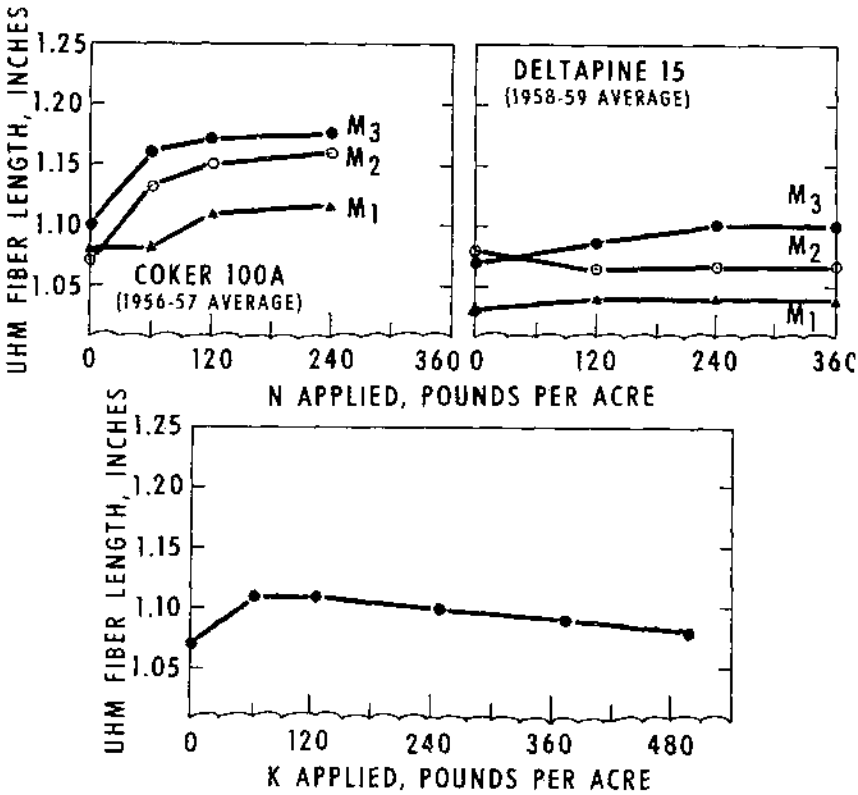

FIGURE 14.—Upper half mean fiber length of cotton fibers, as affected by rate of N application × moisture level (top) and by rate of K application (bottom). M_1, no irrigation; M_2 and M_3, irrigated when 65 and 35 percent, respectively, of the available soil moisture was depleted from top 24 inches of soil.

Topping plants at a height of 48 inches increased UHM fiber length of the eight varieties of cotton tested in 1960, but it had no effect on length of fiber from most varieties in 1961 (app. table 37). However, topping plants of Auburn 56 variety increased UHM fiber length both years. In other studies to determine the effect of height of topping and side-branch pruning on yield and lint quality, topping plants of Auburn 56 variety at 42 and 48 inches increased UHM fiber length at the first picking in both 1960 and 1961 (app. table 38). Topping plants at 42 and 48 inches with side-branch pruning and topping plants at 42 inches when 52 inches high increased UHM fiber length at the first picking in 1960. All topping studies indicated that the greatest influence of topping or pruning was on early-maturing bolls.

Differences in UHM fiber length because of variety were found each year; however, the 2-year average values were similar (app. table 42). The greatest differences were the result of picking date in all studies.

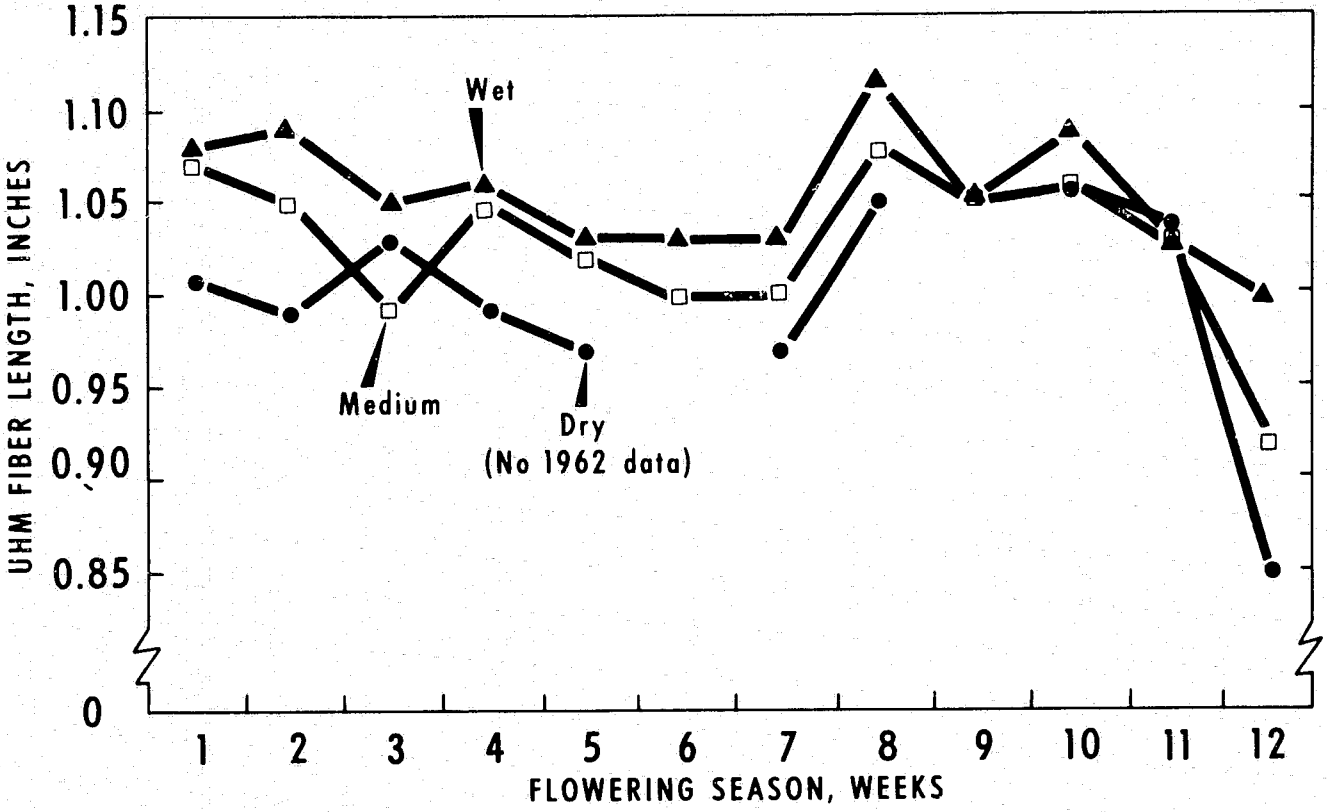

FIGURE 15.—Upper half mean length for Deltapine Smooth Leaf cotton, as affected by soil moisture, Tempe, Ariz. (1961 and 1962)

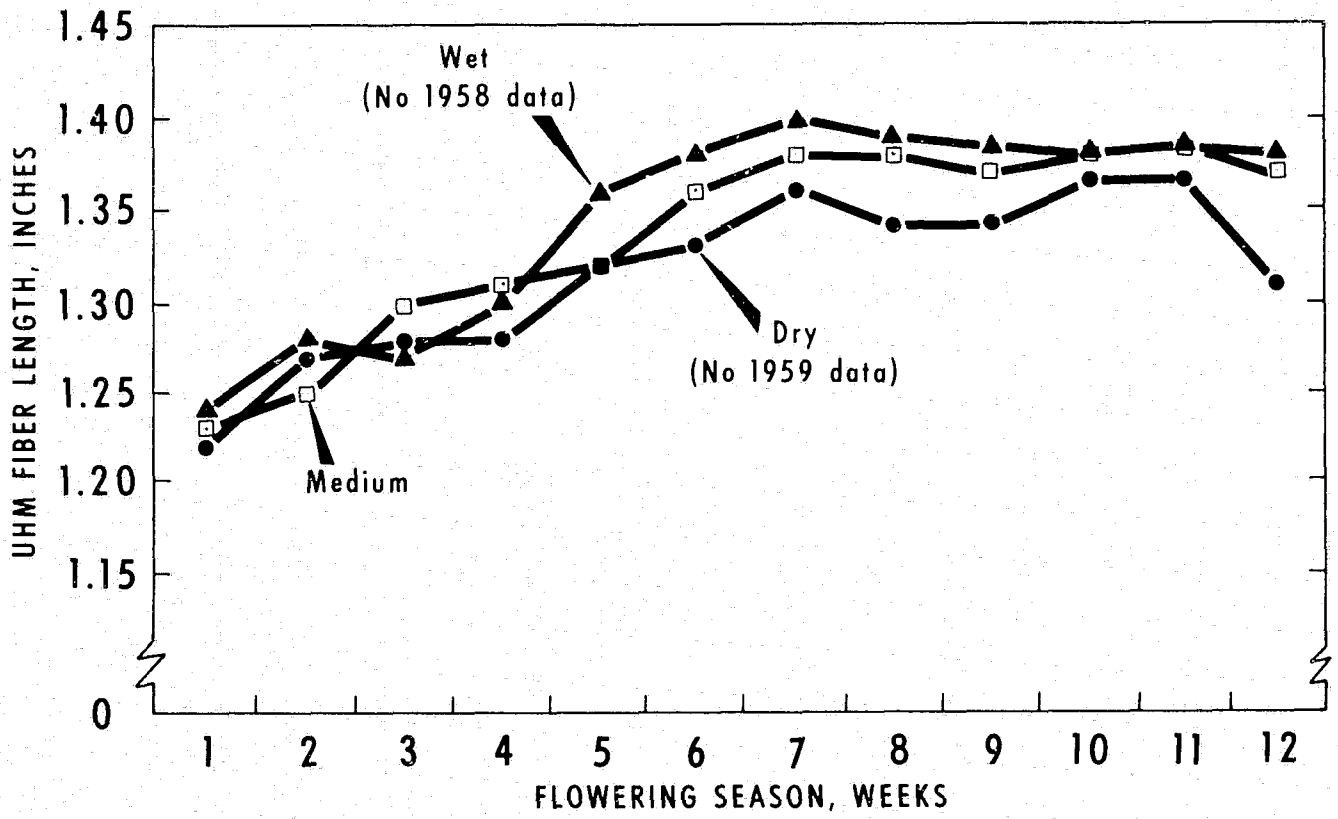

FIGURE 16.—Upper half mean length for Pima S–1 cotton, as affected by soil moisture, Tempe, Ariz. (1958, 1959, and 1960)

Arizona

Upper half mean length was shortest with the wet soil moisture regime for Acala 44 in 2 of 4 years, and it was not affected in the other years (app. table 43). For Deltapine Smooth Leaf and Pima S-1, UHM fiber length was longest with the wet soil moisture regimes, except for Pima S-1 in 1960 it was longest with the medium soil moisture regime (figs. 15 and 16).

The UHM fiber length varied according to week of flowering of bolls for all varieties in all years except in 1962 for Deltapine Smooth Leaf. For Pima S-1, the UHM fiber length gradually increased for bolls set through the first 7 weeks of the flowering season, then it was constant for bolls set the rest of the year except it decreased for bolls set the last week of the flowering season (fig. 16).

The average weekly UHM fiber length for the test years was 1.061 for Acala 44, 1.034 for Deltapine Smooth Leaf, and 1.337 for Pima S-1. The UHM fiber length varied less than 4 percent between years for all varieties.

California

The UHM fiber length was not affected by rate or timing of N applications during the 8-year period 1952-59. As available soil moisture level was decreased, UHM fiber length was reduced in more than 50 percent of the tests conducted (app. table 44). The decreases resulting from the soil moisture regimes in 1958, however, did not occur again when the same regimes were repeated in 1959. Data from all tests show that variety differences are far more important in producing variations in fiber length than is the level of N fertilization or soil moisture regime.

Fiber Uniformity

Alabama

Fiber uniformity was not affected by either rate of N application or soil moisture level in 1956, 1957, or 1958. Uniformity was decreased by irrigation and by extremely high rates of N application (480 and 720 pounds per acre) in 1959. When all values were averaged for a 4-year period, rate of N application and moisture level had no effect on uniformity.

The most uniform fibers were obtained with an application of 62.5 pounds per acre of K (app. table 45). Fiber uniformity was usually lowest at the first picking at most rates of K. Variations between picking dates were greater than those between rates of K applied. In studies with combinations of rates of N and K applications, fiber uniformity was highest at lower rates of N and K (app. table 36). The data indicate the K requirements of the plants are more critical for uniform fibers than are N requirements.

For the eight varieties of cotton tested, topping plants at a height of 48 inches did not affect fiber uniformity in a 2-year period. In other studies to determine effect of height of topping and side-branch pruning on yield and lint quality of Auburn 56 variety, fiber uniformity was reduced by topping plants at 36 inches when 39 inches high. Other topping and pruning treatments did not consistently affect fiber uniformity in a 2-year period. Variety did not affect fiber uniformity in a 4-year period.

Arizona

Soil moisture regimes affected fiber uniformity in 2 of 4 years for Acala 44, in 1 of 2 years for Deltapine Smooth Leaf, and in 2 of 3 years for Pima S–1. Fiber length was usually less uniform for Pima S–1 and Acala 44 as soil moisture was increased. The highest percentage of uniformity for Deltapine Smooth Leaf was obtained with the medium moisture regime. (App. tables 46, 47, and 48.)

Uniformity varied according to week of flowering of bolls for all varieties and all years except in 1960 for Acala 44. Fiber length was generally less uniform for all varieties from bolls set during the first and last weeks of the flowering season.

The average weekly uniformity measurement for the test years was 74.7 percent for Acala 44, 68.5 percent for Deltapine Smooth Leaf, and 86.3 percent for Pima S–1. Uniformity varied less than 7 percent for all varieties and test years.

California

Fiber uniformity was not affected by rate or timing of N applications or by soil moisture regimes used.

Fiber Strength

Alabama

Fiber strength was not consistently affected by rate of N application, but it was reduced by irrigation (app. table 49). Fiber strength was lowest with a combination of high N with irrigation. Fiber strength was not affected by moisture level in 1958, since rainfall was high and very little irrigation water was required. The addition of 125 pounds per acre of K produced fibers with the greatest strength, but higher rates reduced fiber strength (app. table 50). Large differences in fiber strength as a result of harvest date were prevalent at all rates of K application. Studies conducted during 1961–62 with various combinations of rates of N and K application did not show any interaction of N × K on fiber strength.

Topping plants at a height of 48 inches increased fiber strength of most varieties tested (app. table 51). Only one of eight varieties showed a slight reduction in fiber strength from topping in a 2-year period. Large differences in fiber strength between varieties were found for both years, with and without topping. Fiber strength was not uniformly affected in studies to determine the effect of height of topping, with and without side-branch pruning, on fiber properties. Differences in fiber strength between picking dates were greater than differences as a result of topping or pruning.

Varieties varied considerably in fiber strength in a 2-year period (app. table 52); this indicates that fiber strength is influenced by genetic as well as environmental factors.

Arizona

Fiber strength was not consistently affected by soil moisture regimes. For Acala 44, in 1958 soil moisture regime did not affect fiber strength; in 1961 the driest soil moisture regime produced the strongest fiber, but in 1960 the reverse occurred. For Deltapine Smooth Leaf, soil moisture regime did not affect fiber strength in either test year. For Pima S–1, in 1958 the fiber strength was highest

with the dry soil moisture regime; however, in 1960 it was highest with the medium soil moisture regime. (App. tables 53, 54, and 55.)

Fiber strength varied according to the week of flowering of bolls for all varieties in all test years. For Deltapine Smooth Leaf and Pima S-1, it was lowest from bolls set during the least productive periods.

The average fiber strength for the test years was 3.40 (T_1) for Acala 44, 3.16 (T_1) for Deltapine Smooth Leaf, and 3.15 (T_1) for Pima S-1.

California

In only 3 of the 15 tests (app. table 10) was fiber strength affected by rate of N application. The 1959-60 data (app. table 40) show significant increases in fiber strength for the R-15 and Deltapine varieties in 1959 but not in 1960 with higher N rates. Variations in the timing of N applications affected fiber strength in only two of seven tests. Strength in these two tests was increased slightly when all the N (240 pounds per acre) was applied by thinning time instead of delaying two-thirds of the total application until midseason. Soil moisture regime affected fiber strength in only one of seven tests. In this test a "very wet" soil moisture regime resulted in a weaker fiber.

External Surface Area "A" and Fiber Flatness "D"

Alabama

External surface area "A" values were determined only on fibers from the 1956 and 1957 rate of N application × moisture level study. The "A" value was increased with increasing soil moisture level in 1956 but was decreased by irrigation in 1957 (app. table 56). Rainfall was considerably less during the 1956 growing season than in 1957. Rates of N application did not consistently affect "A" values either year.

The fiber flatness "D" was increased by increasing soil moisture level in 1956, but it was reduced by irrigation in 1957 (app. table 56). Higher rates of N application had a tendency to increase "D" values in 1957.

California

A summary of the effect of soil moisture regime on external surface area "A" and fiber flatness "D" is given in appendix table 57. For the three tests shown, external surface area "A" was decreased when a high percentage of the available soil moisture was used before the crop was irrigated. Fiber flatness "D" was similarly, but not so consistently, affected.

Fiber Elongation (E_0, E_1)

Alabama

Rate of N application had no consistent effect on fiber elongation (E_0, E_1) (app. table 58). Elongation was usually increased by increasing available soil moisture level. In a study to determine the effects of rate of K application on yield and fiber quality, an application of 62.5 pounds of K per acre produced the lowest percentage of fiber elongation. Studies with various rates of N and K application did not show any apparent relationship between fiber elongation and rates of N and K applied.

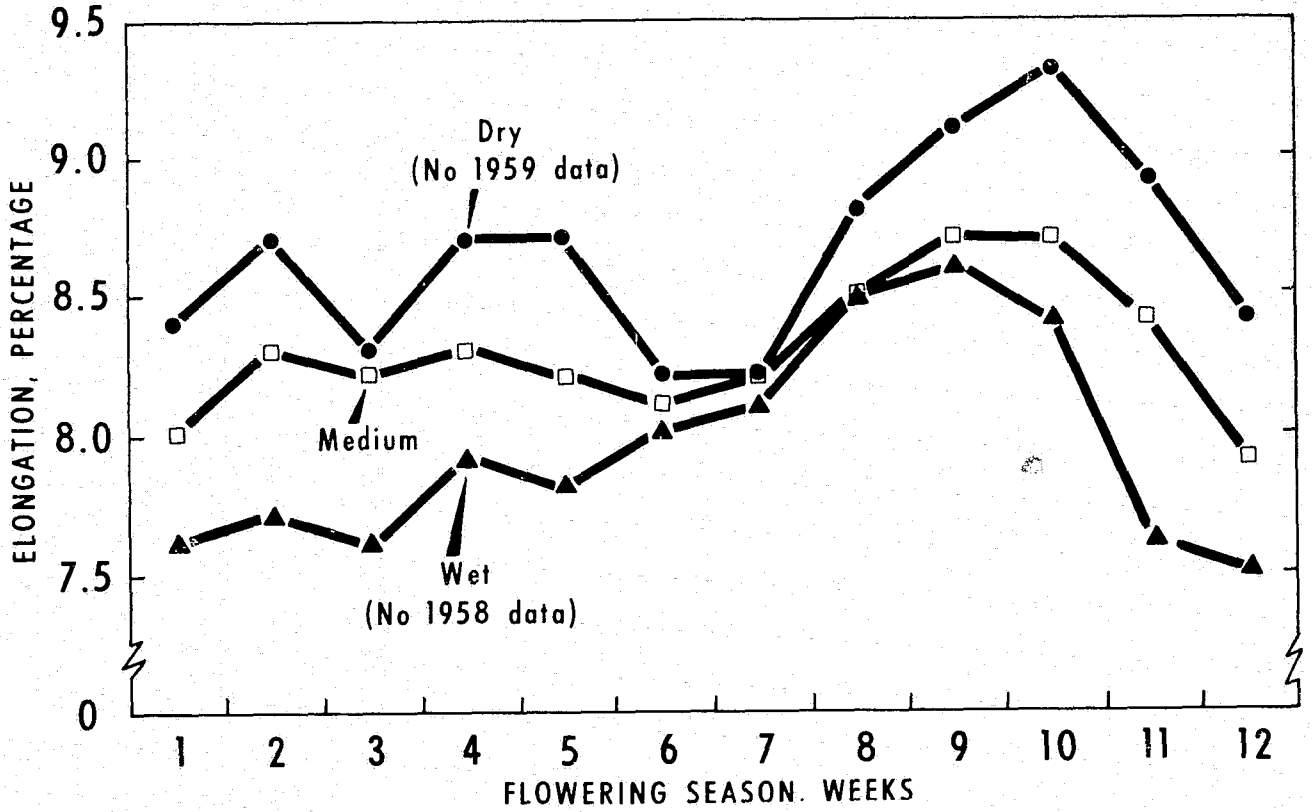

FIGURE 17.—Mean elongation for Pima S–1 cotton, as affected by soil moisture, Tempe, Ariz. (1958 and 1959)

Topping plants at a height of 48 inches generally reduced fiber elongation (E_8, E_1) of the eight varieties of cotton tested (app. table 59). However, elongation differences as a result of variety were greater than between topped and untopped plants of the same variety. Topping at heights of 36, 42, and 48 inches, with and without side-branch pruning, did not consistently affect fiber elongation (app. table 60).

Fiber elongation varied between varieties, but there were greater differences between years for the same variety than between varieties (app. table 61).

Arizona

In 1 of 2 years for the Pima S–1 variety, fiber elongation (E_1) increased as available soil moisture was decreased (fig. 17). Differences in elongation were pronounced for bolls set during maximum production periods. Fiber elongation (E_1) varied according to week of flowering of bolls and was greatest for bolls set immediately after the August low-flowering period (fig. 17).

Average fiber elongation (E_1) for the Pima S–1 variety ranged from 8.54 percent in 1958 to 7.98 in 1959, with an average weekly elongation value of 8.26 percent for the 2 years.

California

Fiber elongation (E_1) was usually increased by maintaining a high soil moisture level (app. table 57).

Micronaire Values

Alabama

Micronaire values were not consistently affected by the addition of N; whereas, irrigation usually increased micronaire values (app. table 62). Micronaire values were generally increased by the addition of K with maximum values obtained with 62.5 pounds of K per acre (app. table 63). In studies to determine effect of various combinations of rates of N and K, the application of some K increased micronaire values (app. table 64). The lowest micronaire values were obtained both years from plants receiving 360 pounds of N per acre without additional K applications.

Micronaire values of most varieties were increased by topping plants at 48 inches as compared with untopped plants (app. table 65). Differences in micronaire values attributed to variety were prevalent both years with or without plants topped. Topping plants at 36, 42, or 48 inches, with and without side-branch pruning, affected micronaire values in some cases (app. table 66). Pruning side branches without topping and topping at 48 inches increased micronaire values both years, especially at first harvest. Topping or side-branch pruning increased average micronaire values in 1961. Differences in micronaire values between varieties and between years for the same variety were prevalent in a 4-year period with all topping and side-branch pruning treatments.

Arizona

Micronaire values were not consistently affected by soil moisture regime. For Acala 44, micronaire values were lowest with the dry

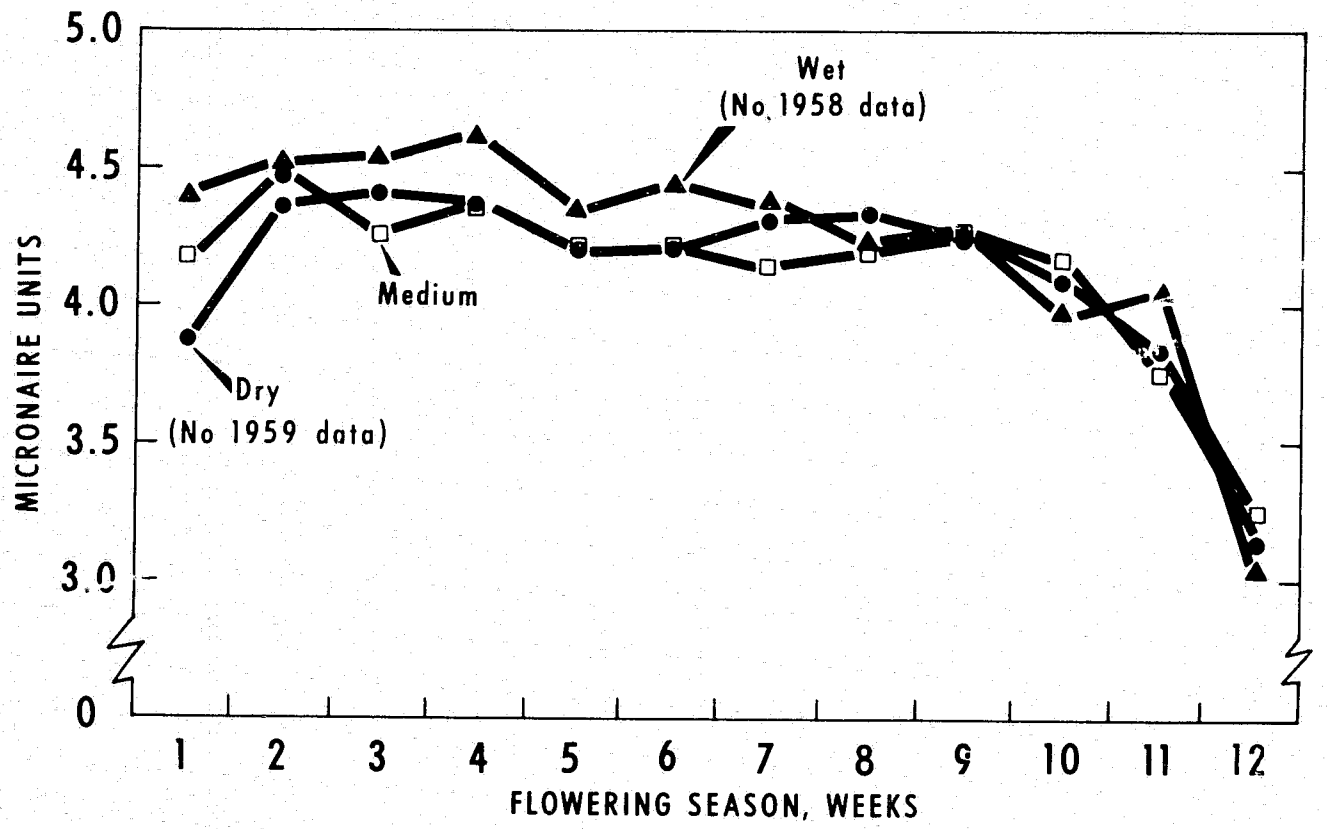

FIGURE 18.—Mean micronaire for Acala 44, as affected by soil moisture, Tempe, Ariz. (1958, 1959, 1960, 1961)

soil moisture regime in 3 years but were not affected by soil moisture regime in 1961. In contrast, for Pima S–1 the micronaire values were highest with dry soil moisture regime. The micronaire values for Deltapine Smooth Leaf were not affected by soil moisture regime. (App. tables 67 and 68.)

Micronaire values for all varieties tested varied according to week of flowering of bolls. For Acala 44, micronaire values were highest for bolls set during the peak production period in July and they generally decreased for bolls set later in the season (fig. 18). For Deltapine Smooth Leaf, they were high for bolls set during the peak production period but they were very low for bolls set the last 2 weeks of the flowering period (app. table 68). For Pima S–1, they were highest for bolls set during the low production period in August and they were usually lowest for bolls set during the first and last week of the flowering season (app. table 67).

The average weekly micronaire value for Acala 44 was 4.21, for Deltapine Smooth Leaf, 4.71, and for Pima S–1, 3.14. Micronaire values varied less than 10 percent between years.

California

Increased rate of N application increased micronaire values in four of six tests (app. table 40). With amounts of N beyond that necessary for maximum yield no further change was observed. Low soil moisture usually increased micronaire values in 1958, but soil moisture treatment had no effect in 1959 (app. table 69).

Spinning Properties

Yarn Strength

California

High rates of N applications increased yarn strength for R–15 and Deltapine 15, but there was no effect on Acala 4–42 (app. table 40).

Neps

California

Rate of N application had no effect on the number of neps appearing in the spun fiber from the three varieties grown (app. table 40). Differences due to variety were not significant.

SUMMARY

Field studies were conducted at Thorsby, Ala., from 1956 to 1962; at Tempe, Ariz., from 1954 to 1962; and at Brawley, Calif., from 1951 to 1960, to determine the effects of irrigation levels, fertilizer rates, and other management practices on boll, fiber, and spinning properties of cotton.

Alabama

Irrigation increased boll size and upper half mean fiber length and usually increased mean fiber length, external surface area "A," fiber flatness "D," fiber elongation, and micronaire values. Irrigation

decreased lint percentage and fiber strength. Other boll and fiber properties were not affected by irrigation.

Nitrogen at rates necessary for maximum production increased boll size, seed index, fiber length, and fiber flatness "D." High rates of N application usually decreased lint percentage, lint index, and fiber strength. Other boll and fiber properties were not affected by rates of N application.

Potassium applications of 62.5 pounds per acre usually increased boll size, fiber length, fiber uniformity, fiber strength, and micronaire values, but K applications decreased lint percentage and fiber elongation.

There was no interaction between N and K on boll and fiber properties.

Topping cotton plants at 48 inches increased lint percentage, fiber length, fiber strength, and micronaire values but usually reduced percentage of fiber elongation of the eight varieties tested. Fiber uniformity was not affected by topping plants of the eight varieties.

Topping Auburn 56 variety at 36, 42, and 48 inches with and without side-branch pruning increased lint percentage and micronaire values. In general, topping plants at 48 inches usually improved fiber quality.

Variety and picking dates affected fiber quality. Variety appeared to be the most important factor in determining quality by most measurements.

Arizona

Date of flowering affected boll and fiber properties. Early-set bolls usually were smaller and had fewer seed per boll than those set later. Bolls set during the peak of the flowering season always produced the highest lint percentage and usually had the strongest fiber. Bolls set immediately after the August "cutout" had the greatest fiber elongation—for the one variety tested. Bolls set the first week and the last week of the flowering season usually produced the shortest fiber and fiber of least uniform length and with the lowest micronaire values. Bolls set during the last week of the flowering season generally produced fiber having low lint index and seed index.

Increased available soil moisture increased boll size, with one exception, and number of seeds per boll, but it ususally decreased fiber uniformity and fiber elongation. The soil moisture regime had no consistent effect on lint percentage, lint index, seed index, fiber length, fiber strength, and micronaire values.

California

Soil moisture regime and rate of N application had more effect on boll properties than on fiber and spinning properties. Timing of N application had little effect on either boll or fiber and spinning properties.

Increased available soil moisture generally increased lint index, seed index, boll size, number of seeds per boll, fiber length, external area "A," fiber flatness "D," and fiber elongation, but it usually decreased micronaire values. Soil moisture regime had no consistent effect on lint percentage, fiber uniformity, and fiber strength.

Higher rates of N application generally increased lint index, seed index, boll size, micronaire values, and yarn strength. Rate of N application had no consistent effect on lint percentage, number of seeds per boll, fiber length, fiber uniformity, fiber strength, surface area "A," fiber flatness "D," fiber elongation (E_1) nor on the number of neps appearing in the spun fiber.

CONCLUSIONS

1. Proper fertilization was necessary for maximum boll and fiber development of cotton.
2. Fiber properties were altered by adverse soil moisture conditions (either too little or too much).
3. Boll and fiber properties varied considerably with date bolls were set.
4. Large differences in boll and fiber properties between varieties were found at all three locations.
5. Similar management practices tended to affect boll and fiber properties of cotton in a similar manner at all three locations.

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APPENDIX

TABLE 3.—*Yield of lint for 2 varieties of irrigated cotton, as affected by rate of nitrogen application and moisture level, Thorsby, Ala., 1956–59*

[Coker 100–A in 1956 and 1957 and Stoneville 7 in 1958 and 1959]

Moisture level and rate of N application, pounds per acre [1]	Yields of lint [2]			
	1956	1957	1958	1959
M_1:	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*
0	685 b	802 c	1,057 b	867 a
60	736 a	1,017 a		
120	720 a	947 ab	1,516 a	849 a
240	725 a	934 ab	1,462 a	796 a
360			1,440 a	809 a
Average	717 y	925 z	1,369 z	830 y
M_2:				
0	988 c	824 c	1,089 c	1,397 b
60	1,048 b	1,240 b		
120	1,457 ab	1,472 ab	1,519 b	1,687 a
240	1,526 a	1,499 a	1,673 a	1,713 a
360			1,627 ab	1,694 a
Average	1,345 x	1,259 y	1,477 y	1,623 x
M_3:				
0	1,005 c	847 d	1,131 d	1,292 b
60	1,305 b	1,251 c		
120	1,372 b	1,449 b	1,538 c	1,579 a
240	1,769 a	1,819 a	1,832 b	1,633 a
360			2,017 a	1,624 a
480				1,575 a
720				1,594 a
Average	1,363 x	1,362 x	1,630 x	1,550 x

[1] M_1, no irrigation; M_2 and M_3, irrigated when 65 and 35 percent, respectively, of the available soil moisture was depleted from the surface 24 inches of soil.

[2] Values for rate of N for each moisture level, by years, followed by the same letter or letters or the averages for all N rates at each moisture level, by years, followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 4.—*Yield of lint for Stoneville 7 cotton, as affected by rate of potassium application, Thorsby, Ala., 1960–61*

Rate of K applied, pounds per acre [1]	Yield of lint [2]		
	1960	1961	2-year average
	Lb./acre	*Lb./acre*	*Lb./acre*
0	1,040 e	569 f	805 d
62.5	1,542 d	1,501 e	1,522 c
125	1,629 c	1,632 d	1,631 b
250	1,812 ab	1,905 a	1,859 a
375	1,832 ab	1,871 ab	1,852 a
500	1,890 a	1,777 c	1,834 a

[1] All plots received 360 lb. of N and 132 lb. of P per acre, annually.
[2] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 5.—*Yield of lint, as affected by rate of nitrogen and potassium applications, Thorsby, Ala., 1961–62*

[Stoneville 7 in 1961; Auburn 56 in 1962]

Rate of application [1]		Yield of lint [2]		
N	K	1961	1962	2-year average
Lb./acre	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*
120	125	1,425 abc	1,372 a	1,399 a
120	250	1,414 bc	1,349 a	1,382 a
120	500	1,431 abc	1,393 a	1,412 a
240	125	1,432 ab	1,355 a	1,419 a
240	250	1,517 ab	1,405 a	1,461 a
240	500	1,462 ab	1,397 a	1,430 a
360	125	1,541 ab	1,371 a	1,456 a
360	250	1,561 a	1,370 a	1,466 a
360	500	1,498 ab	1,433 a	1,466 a
0	0	750 e	870 d	810 d
0	500	955 d	1,034 c	955 c
360	0	1,299 bc	1,204 b	1,252 b

[1] All plots received 132 lb. of P per acre, annually. Irrigated when 50 percent of the available soil moisture was depleted from the top 24 inches of soil.
[2] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 6.—*Yield of lint for 8 varieties of irrigated cotton, as affected by plant topping, Thorsby, Ala., 1960–61*

Variety [1]	Yield of lint for year and treatment indicated [2 3]					
	1960		1961		2-year average	
	T	U	T	U	T	U
	Lb./acre	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*
Stardel	1,385 a	1,413 a	1,287 cd	1,287 bc	1,336 a	1,346 a
Stoneville 7	1,275 b	1,314 ab	1,376 bc	1,357 ab	1,326 a	1,345 a
Empire	1,040 b	1,066 e	1,308 c	1,141 de	1,174 b	1,104 de
Coker 124 B	1,173 c	1,176 cd	1,555 a	1,401 a	1,364 a	1,289 ab
Auburn 56	1,260 bc	1,116 de	1,439 ab	1,212 cd	1,350 a	1,164 cd
La DC–10	1,061 d	1,074 e	1,192 d	1,069 e	1,127 b	1,072 e
Arizona Acala 44	1,245 bc	1,252 bc	1,104 e	1,163 d	1,175 b	1,208 bc
Delta Queen	1,262 bc	1,162 cd	1,488 ab	1,344 ab	1,375 a	1,253 b
Average all varieties	1,213 x	1,197 x	1,344 x	1,248 y	1,278 x	1,223 y

[1] All varieties fertilized with 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually.

[2] T, plants topped at 48 inches when 51 inches high; U, plants not topped.

[3] Values in the same column followed by the same letter or letters or the averages of topped and not topped, by years, followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 7.—*Yield of lint for Auburn 56 cotton, as affected by topping and side-branch pruning, Thorsby, Ala., 1960–61*

[Plant population—2 or 3 per foot]

Treatment [1]	Yield of lint [2]	
	1960	1961
	Lb./acre	*Lb./acre*
Check	1,186 d	1,213 c
Side branches pruned	1,423 ab	1,400 b
Topped at 36 inches when 39 inches high	1,376 bc	1,489 a
Topped at 42 inches when 45 inches high	1,472 a	1,337 b
Topped at 48 inches when 51 inches high	1,359 bc	1,432 a
Topped at 42 inches, side branches pruned	1,491 b	1,414 ab
Topped at 48 inches, side branches pruned	1,320 c	1,226 c
Topped at 42 inches when 52 inches high	1,419 ab	1,502 a

[1] All plots received 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually. Irrigated when 50 percent of the available soil moisture was depleted from the top 24 inches of soil.

[2] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 8.—*Yield of lint for 9 varieties of irrigated cotton, Thorsby, Ala., 1958–59*

Variety [1]	Yield of lint [2]	
	1958	1959
	Lb./acre	*Lb./acre*
Deltapine 15	1,409 b	1,440 bc
Stoneville 7	1,551 a	1,736 a
Empire	1,374 bc	1,416 bcd
Coker 100–A	1,367 bc	1,317 d
Rex	1,368 bc	----------
Acala 4–42	1,310 c	1,358 cd
Acala 44	1,637 a	1,508 b
Plains	1,427 b	1,330 d
Auburn 56	----------	1,175 e

[1] All varieties fertilized with 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually. Irrigation applied uniformly to all varieties when 50 percent of available soil moisture was depleted from top 24 inches of soil.

[2] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 9.—*Yield of lint for 3 varieties of irrigated cotton, as affected by soil moisture regime, variety, and year, Tempe, Ariz. 1958–62*

Year	Yield of lint for variety and moisture regime indicated [1]								
	Acala 44			Pima S-1			Deltapine Smooth Leaf		
	W	M	D	W	M	D	W	M	D
	Lb./acre	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*
1958	----------	1,378	1,040	----------	810	610	----------	----------	----------
1959	1,138	1,205	----------	758	720	----------	----------	----------	----------
1960	1,325	1,200	1,055	775	680	695	----------	----------	----------
1961	1,360	1,310	1,130	----------	----------	----------	1,335	1,355	990
1962	----------	----------	----------	----------	----------	----------	1,390	1,325	----------

[1] Moisture regimes: W, wet; M, medium; and D, dry.

TABLE 10.—*Yield of lint for 4 varieties of irrigated cotton, as affected by rate of nitrogen application, Brawley, Calif., 1951–54, 1959–60*

Rate of N applied, pounds per acre [1]	Yield of lint for variety and year indicated [2 3]							
	Acala 4–42							
	1951–1	1951–2	1952–1	1952–2	1953–1	1953–2	1953–3	1953–4
	Lb./acre	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*
0	1,227 c		1,650 a	1,430 a	805 d	999 c	816 c	985 c
40	1,335 c	1,297 b	1,645 a		1,045 c			
80	1,409 bc	1,493 a	1,565 a	1,460 a	1,230 b	1,369 b	1,146 b	1,125 b
120		1,452 ab						
160	1,549 ab		1,655 a	1,425 a	1,465 a	1,576 a	1,495 a	
240	1,653 a		1,590 a		1,550 a			1,290 a
360								

Rate of N applied, pounds per acre	Acala 4–42			R–15		Deltapine 15, 1959–1	Deltapine Smooth Leaf, 1960–1
	1954–1	1959–1	1960–1	1959–1	1960–1		
	Lb./acre	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*
0	1,330 b	875 b	1,135 b	930 b	1,275 bc	1,125 b	1,325 b
40							
80	1,875 a						
120		1,160 a	1,390 a	1,255 a	1,495 ab	1,390 a	1,655 a
160	1,850 a						
240	1,890 a	1,130 a	1,365 ab	1,215 a	1,535 a	1,520 a	1,715 a
360		1,110 a	1,405 a	1,185 a	1,500 ab	1,485 a	1,725 a

[1] All nitrogen fertilizer was applied by early June.
[2] Number after the year refers to experiment number.
[3] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 11.—*Yield of lint for 2 varieties of irrigated cotton, as affected by rate and timing of nitrogen applications, Brawley, Calif., 1951–53*

Nitrogen applied per acre					Yield of lint for variety and year indicated [1] [2]			
					Acala 4–42			
Preplant	Thinning	Midseason	Late-season	Total	1951–1	1952–1	1953–1	
Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Lb./acre*	*Lb./acre*	*Lb./acre*	
40	0	0	0	40	1,335	c	1,640	a	1,045	d
0	40	0	0	40	1,488	abc	1,780	a	1,090	cd
80	0	0	0	80	1,409	bc	1,565	a	1,230	b
40	40	0	0	80	1,458	abc	1,715	a	1,195	bc
0	80	0	0	80	1,576	ab	1,615	a	1,185	bc
160	0	0	0	160	1,549	ab	1,655	a	1,465	a
40	120	0	0	160	1,660	a	1,730	a	1,430	a
0	160	0	0	160	1,615	a	1,625	a	1,455	a
40	40	40	40	160			1,660	a	1,500	a

					Acala 4–42		R–15	
					1958–1	1959–2	1958–1	1959–2
					Lb./acre	*Lb./acre*	*Lb./acre*	*Lb./acre*
80	0	160	0	240	1,790	b	1,270	a	1,975	a	1,275	a
80	80	80	0	240	1,940	a	1,305	a	1,985	a	1,250	a
80	160	0	0	240	1,900	a	1,180	a	1,950	a	1,205	a

[1] Number after the year refers to experiment number.

[2] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 12.—*Yield of lint for 2 varieties of irrigated cotton, as affected by soil moisture regime, Brawley, Calif., 1952–54, 1958–59*

Available soil moisture used at time of irrigations (0- to 24-inch depth)			Yield of lint for variety and year indicated [2] [3]						
			Acala 4–42					R–15	
1st bloom	Cutout [1]	2d bloom	1952–2	1953–4	1954–1	1958–1	1959–2	1958–1	1959–2
Percent	*Percent*	*Percent*	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*	*Lb./acre*
25	25	25		1,320 a	1,605 b				
35	35	35	1,825 a	1,200 b	1,745 ab	2,000 a	1,375 a	2,190 a	1,396 ab
50	50	50		1,235 b	1,815 a	1,935 ab	1,345 ab	1,960 abc	1,355 bc
70	70	70	1,330 c	925 d	1,813 a				
80	80	80				1,730 b	1,045 c	1,765 c	935 e
100	100	100	9.0 d						
25	70	25			1,695 ab				
50	35	35				2,000 a	1,400 a	2,145 ab	1,480 a
35	70	70	1,620 b	1,005 c					
50	80	80				1,845 ab	1,070 c	1,820 c	1,030 d
35	100	100	1,515 b						
80	50	50				1,765 ab	1,270 b	1,945 bc	1,265 c

[1] Growth period during midseason (mid-July through mid-August) characterized by a decline in blossom production, boll set, and terminal growth.

[2] Number after the year refers to experiment number.

[3] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 13—*Lint percentage for irrigated cotton, as affected by rate of nitrogen and potassium applications, Thorsby, Ala., 1961–62*

[Stoneville 7 in 1961; Auburn 56 in 1962]

Rate of application [1]		Lint percentage [2]	
N	K	1961	1962
Lb./acre	*Lb./acre*	*Percent*	*Percent*
120	125	38.4 b	36.0 c
120	250	38.2 b	35.4 f
120	500	38.2 b	35.5 cde
240	125	38.1 b	34.8 ef
240	250	37.8 b	35.1 def
240	500	37.5 b	35.1 def
360	125	38.5 b	34.6 f
360	250	38.0 b	35.7 cd
360	500	37.6 b	34.5 cde
0	0	40.7 a	39.1 a
0	500	41.2 a	38.9 a
360	0	38.4 b	37.0 b

[1] All plots received 132 lb. of P per acre, annually. Irrigated when 50 percent of the available soil moisture was depleted from the top 24 inches of soil.

[2] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 14.—*Lint percentage for 8 varieties of irrigated cotton, as affected by plant topping, Thorsby, Ala., 1960–61*

Variety [1]	Lint percentage for year and treatment indicated [2 3]					
	1960		1961		2-year average	
	T	U	T	U	T	U
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Stardel	38.5 a	38.6 a	36.9 b	36.9 ab	37.7 b	37.7 a
Stoneville 7	38.9 a	38.6 a	37.7 a	37.4 a	38.3 a	38.0 a
Empire	35.3 d	35.1 c	34.4 d	34.5 fg	34.9 e	34.8 de
Coker 124 B	36.9 c	36.3 b	35.7 c	34.9 ef	36.3 d	35.1 d
Auburn 56	35.8 d	35.3 c	34.7 d	34.1 g	35.3 e	34.7 e
La DC–10	37.2 c	36.9 b	36.1 c	35.9 cd	36.7 d	36.4 c
Arizona Acala 44	38.1 ab	38.0 a	36.3 bc	36.3 bc	37.2 c	37.2 bc
Delta Queen	37.5 bc	37.1 b	35.7 c	35.4 de	36.6 d	36.3 c
Average all varieties	37.3 x	37.0 y	35.9 x	35.7 x	36.6 x	36.3 y

[1] All varieties fertilized with 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually.
[2] T, plants topped at 48 inches when 51 inches high; U, plants not topped.
[3] Values in the same column followed by the same letter or letters or the averages of topped and not topped, by years, followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 15.—*Lint percentage for Auburn 56 cotton, as affected by topping and side-branch pruning of plants, Thorsby, Ala., 1960-61*

[Plant population—2 or 3 per foot]

Treatment [1]	Lint percentage [2]		
	1960	1961	2-year average
	Percent	*Percent*	*Percent*
Check	34.9 bc	33.9 d	34.4 d
Side branches pruned	35.4 a	34.3 bc	34.9 ab
Topped at 36 inches when 39 inches high	34.8 bc	34.0 cd	34.4 d
Topped at 42 inches when 45 inches high	35.4 a	34.4 abc	34.9 ab
Topped at 48 inches when 51 inches high	35.0 ab	34.3 bc	34.7 bc
Topped at 42 inches, side branches pruned	35.1 ab	34.2 cd	34.7 bc
Topped at 48 inches, side branches pruned	34.5 c	34.6 ab	34.6 cd
Topped at 42 inches when 52 inches high	35.2 ab	34.7 a	35.0 a

[1] All plots received 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually. Irrigated when 50 percent of the available water was depleted from the top 24 inches of soil.

[2] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 16.—*Lint percentage for 9 varieties of irrigated cotton, Thorsby, Ala., 1958–59*

Variety [1]	Lint percentage [2]	
	1958	1959
	Percent	*Percent*
Deltapine 15	39.0 a	38.0 ab
Stoneville 7		38.8 a
Empire	35.2 d	36.0 de
Coker 100-A	35.7 cd	36.6 cd
Rex	36.0 cd	
Acala 4-42	37.1 b	37.6 bc
Acala 44	38.2 a	37.4 bc
Plains	36.1 c	36.5 cd
Auburn 56		35.3 e

[1] All varieties fertilized with 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually. Irrigation applied uniformly to all varieties when 50 percent of available soil moisture was depleted from top 24 inches of soil.

[2] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 17.—*Mean lint percentage for Acala 44 cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1958–61*

Date of flowering, week No.	Lint percentage for year and moisture regime indicated [1] [2]									
	1958		1959		1960			1961		
	M	D	W	M	W	M	D	W	M	D
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
1	36.4	35.9	35.0	35.4	36.8	36.8	35.7	34.2	35.7	35.1
2	37.0	35.8	34.2	34.6	37.5	35.8	36.0	35.6	36.4	36.5
3	35.0	34.9	35.6	35.2	38.1	37.7	38.9	35.4	34.1	35.3
4	37.2	36.9	36.1	36.3	39.0	37.1	38.1	36.0	35.0	36.4
5	38.1	38.8	35.6	35.1	36.0	36.5	34.3	37.3	36.7	37.3
6	38.3	38.0	36.4	35.2	35.7	36.3	34.8	36.4	35.8	37.2
7	37.2	36.2	35.5	35.9	34.9	36.3	35.7	37.5	36.9	37.2
8	35.4	35.3	34.6	36.6	33.6	34.1	34.6	36.4	36.6	37.1
9	37.1	36.8	36.4	37.8	35.1	34.6	36.4	35.7	36.8	37.5
10	37.8	37.2	36.1	36.7	37.5	38.6	35.9	34.9	35.1	37.5
11	36.7	36.3	35.9	33.8	37.4	37.2	36.2	31.8	32.1	35.6
12	36.0	35.8	33.6	30.8	36.0	35.4	35.8	31.4	31.4	31.8
Mean	36.9	36.5	35.4	35.3	36.5	36.4	36.0	35.2	35.2	36.2

Water	NS	NS	NS	**
Weeks	**	**	**	**
Water × weeks	**	**	**	NS
Duncan's multiple range test (5-percent):				
Water				0.63–0.77
Weeks	0.88–0.99	0.81–0.94	1.09–1.27	1.27–1.47

[1] Moisture regimes: W, wet; M, medium; and D, dry.
[2] NS, no significant difference; **, 1-percent level of significance.

TABLE 18.—*Boll properties for 4 varieties of irrigated cotton, as affected by rate of nitrogen applications, Brawley, Calif., 1959–60*

Variety	Rate of N applied	Lint percentage [1 2]		Lint index [1 2 3]		Boll size [1 2]	
		1959–1	1960–1	1959–1	1960–1	1959–1	1960–1
	Lb./acre	*Percent*	*Percent*	*Grams*	*Grams*	*Grams*	*Grams*
Acala 4–42	0	36.9 c	36.1 cde	7.40 d	7.08 e	5.45 c	5.67 de
	120	37.4 cd	36.5 def	7.66 e	7.36 ef	5.82 d	5.94 ef
	240	37.4 cd	36.0 cde	7.73 e	7.23 e	6.06 d	6.18 f
	360	37.1 cd	36.9 ef	7.62 e	7.70 f	5.98 d	6.01 f
	Mean	37.2 y	36.4 y	7.60 z	7.34 z	5.83 z	5.95 z
R–15	0	35.0 b	35.6 bcd	6.23 ab	5.96 cd	4.89 b	5.16 c
	120	34.9 ab	35.0 abc	6.37 bc	6.08 d	5.20 c	5.46 cd
	240	34.4 ab	34.6 ab	6.49 c	6.14 d	5.36 c	5.54 d
	360	34.3 a	34.2 a	6.37 bc	6.15 d	5.36 c	5.56 d
	Mean	34.7 x	34.9 x	6.36 y	6.08 y	5.20 y	5.43 y
Deltapine 15 (1959)	0	37.5 cd	35.7 bcde	6.14 a	5.11 a	4.57 a	4.14 a
	120	37.5 cd	36.6 def	6.17 ab	5.56 b	4.77 ab	4.37 ab
Deltapine Smooth Leaf (1960).	240	37.7 d	37.4 f	6.38 bc	5.87 bcd	4.81 ab	4.45 ab
	360	37.6 cd	36.6 def	6.11 a	5.60 bc	4.74 ab	4.58 b
	Mean	37.6 y	35.6 y	6.20 x	5.53 x	4.72 x	4.38 x

Variety	Rate of N applied	Seed index [1] [2] [4]		Seeds per boll [1] [2]	
		1959–1	1960–1	1959–1	1960–1
	Lb./acre	*Grams*	*Grams*	*Number*	*Number*
Acala 4–42	0	12.6 fg	12.5 f	27.1 a	29.0 abc
	120	12.8 g	12.8 fg	28.4 abc	29.5 abcd
	240	12.9 g	12.9 fg	29.3 c	30.9 bcd
	360	12.9 g	13.2 g	29.1 c	28.8 ab
	Mean	12.8 z	12.8 z	28.5 x	29.5 x
R–15	0	11.6 cd	10.8 c	27.5 ab	30.9 bcd
	120	11.9 cd	11.3 d	28.5 abc	31.5 d
	240	12.4 ef	11.6 de	28.4 abc	31.1 cd
	360	12.2 de	11.8 e	28.9 bc	30.9 bcd
	Mean	12.0 y	11.4 y	28.3 x	31.1 y
Deltapine 15 (1959)	0	10.2 a	9.2 a	27.9 abc	28.9 ab
	120	10.2 a	9.6 ab	29.0 bc	28.8 ab
Deltapine Smooth Leaf (1960).	240	10.6 b	9.8 b	28.4 abc	28.3 a
	360	10.1 a	9.7 b	29.2 c	29.9 abcd
	Mean	10.3 x	9.6 x	28.6 x	29.0 x

[1] Number after the year refers to experiment number.

[2] Values for rates of N for each variety, by boll property and year, followed by the same letter or letters or the averages of all N rates for each variety, by boll property and year, followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

[3] Weight of lint per 100 seed.

[4] Weight of 100 seed.

TABLE 19.—*Lint percentage for 2 varieties of irrigated cotton, as affected by rate and timing of nitrogen applications, Brawley, Calif., 1951–53, 58–59*

Nitrogen applied per acre					Lint percentage for variety and year indicated [1] [2]			
Pre-plant	Thinning	Mid-season	Late-season	Total	Acala 4–42			
					1951–1		1952–1	1953–1
Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Percent*		*Percent*	*Percent*
40	0	0	0	40	38.0 a		40.1 a	36.4 a
0	40	0	0	40	37.7 a		40.0 a	37.3 a
80	0	0	0	80	37.4 a		40.0 a	37.3 a
40	40	0	0	80	38.2 a		39.9 a	37.1 a
0	80	0	0	80	37.9 a		39.9 a	36.3 ab
160	0	0	0	160	37.9 a		39.3 a	36.7 ab
40	120	0	0	160	37.3 a		39.6 a	36.4 ab
0	160	0	0	160	37.2 a		39.8 a	35.7 b
40	40	40	40	160	----------		40.1 a	36.0 b
					Acala 4–42		R–15	
					1958–1	1959–2	1958–1	1959–2
					Percent	*Percent*	*Percent*	*Percent*
80	0	160	0	240	37.6 a	37.2 b	37.1 a	35.1 b
80	80	80	0	240	37.6 a	37.8 a	36.8 b	35.1 b
80	160	0	0	240	37.6 a	37.5 ab	36.6 b	35.6 a

[1] Number after the year refers to experiment number.
[2] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 20.—*Lint percentage for 2 varieties of irrigated cotton, as affected by soil moisture regime and variety, Brawley, Calif., 1952–54, 1958–59*

Available soil moisture used at time of irrigations (0- to 24-inch depth)			Lint percentage for variety and year indicated [2,3]						
			Acala 4–42					R–15	
1st bloom	Cutout [1]	2d bloom	1952–2	1953–4	1954–1	1958–1	1959–2	1958–1	1959–2
Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
25	25	25		36.1 a	35.6 c				
35	35	35	39.7 a	35.7 a	36.1 bc	37.2 b	37.4 ab	36.1 c	35.0 ab
50	50	50		36.6 a	36.3 b	37.7 ab	37.4 ab	36.6 b	35.2 ab
70	70	70	39.2 a	36.2 a	37.0 a				
80	80	80				37.6 b	37.5 ab	37.3 a	35.5 ab
100	100	100	39.2 a						
25	70	25			36.0 bc				
50	35	35				37.5 b	37.6 ab	36.6 b	35.2 ab
35	70	70	39.3 a	36.1 a					
50	80	80				38.1 a	37.0 b	37.1 a	34.9 b
35	100	100	39.6 a						
80	50	50				37.4 b	38.1 a	37.5 a	35.9 a

[1] Growth period during midseason (mid-July through mid-August) characterized by a decline in blossom production, boll set, and terminal growth.

[2] Number after the year refers to experiment number.

[3] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 21.—*Lint index for Deltapine 15 cotton, as affected by rate of nitrogen application and moisture level, Thorsby, Ala., 1958*

Rate of N applied, pounds per acre	Lint index at moisture level of [1 2 3]—		
	M_1	M_2	M_3
	Grams	*Grams*	*Grams*
0	6.10 a	5.97 a	6.05 a
120	5.98 ab	5.95 a	5.50 ab
240	5.63 a	5.64 b	5.71 b
360	5.81 bc	5.98 a	5.71 b
Average	5.88 x	5.88 x	5.82 x

[1] Lint index is weight of lint per 100 seed.
[2] M_1, no irrigation; M_2 and M_3, irrigated when 65 and 35 percent, respectively, of the available soil moisture was depleted from top 24 inches of soil.
[3] Values for rate of N for each moisture level followed by the same letter or letters or the averages for all N rates at each moisture level followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 22.—*Mean lint index for Pima S–1 cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1958–60*

Date of flowering, week No. [1]	Lint index for year and moisture regime indicated [1 2 3]						
	1958		1959		1960		
	M	D	W	M	W	M	D
	Grams	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*
1	4.6	4.8	5.0	4.8	6.1	6.1	6.0
2	4.7	4.7	4.5	4.6	5.8	5.6	6.3
3	4.6	4.8	5.0	5.5	6.0	6.0	5.7
4	5.2	5.4	5.2	5.0	5.3	5.7	5.4
5	5.2	4.9	5.1	5.8	5.3	5.7	6.0
6	5.3	5.1	5.3	5.5	5.5	5.3	5.4
7	5.8	5.8	5.8	6.2	5.5	5.4	5.4
8	5.6	5.4	6.2	6.0	5.1	5.4	5.2
9	5.5	5.2	6.1	6.6	5.9	5.7	5.8
10	5.5	5.4	5.8	6.2	5.6	5.6	5.7
11	5.9	6.0	5.8	6.2	5.5	5.3	5.4
12	5.9	5.6	5.4	5.4	4.9	5.3	4.8
Mean	5.3	5.3	5.4	5.6	5.5	5.6	5.6
Water	NS		NS		NS		
Weeks	**		**		**		
Water×weeks	NS		NS		NS		
Duncan's multiple range test (5-percent), weeks	0.18–0.20		0.47–0.55		0.26–0.30		

[1] Lint index is weight of lint per 100 seed.
[2] Moisture regimes: W, wet; M, medium; and D, dry.
[3] NS, no significant differences; **, 1-percent level of significance.

TABLE 23.—*Mean lint index for Deltapine Smooth Leaf cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1961–62*

Date of flowering, week No.	Lint index for year and moisture regime indicated [1 2 3]				
	1961			1962	
	W	M	D	W	M
	Grams	*Grams*	*Grams*	*Grams*	*Grams*
1	6.0	6.0	5.7	6.5	6.2
2	6.0	6.0	6.3	6.1	6.2
3	6.1	6.6	6.1	5.9	5.9
4	5.9	6.3	6.1	5.6	5.9
5	5.9	6.2	6.3	5.5	5.5
6	6.0	6.3	6.4	6.0	5.6
7	6.0	6.4	6.4	5.3	5.6
8	6.0	6.4	6.5	4.8	5.9
9	5.5	6.1	6.0	4.7	5.9
10	6.1	6.0	5.4	4.9	5.6
11	5.6	5.3	5.1	5.5	5.3
12	3.9	4.0	3.7	5.4	5.0
Mean	5.8	6.0	5.8	5.5	5.7
Water		**		NS	
Weeks		**		**	
Water × weeks		NS		NS	
Duncan's multiple range test (5-percent):					
Water		0.17–0.20			
Weeks		.34– .38		0.55–0.60	

[1] Lint index is weight of lint per 100 seed.
[2] Moisture regimes: W, wet; M, medium; and D, dry.
[3] NS, no significant difference; **, 1-percent level of significance.

TABLE 24.—*Lint index for 2 varieties of irrigated cotton, as affected by soil moisture regime and variety, Brawley, Calif., 1952–54, 1958–59*

Available soil moisture used at time of irrigations (0- to 24-inch depth)			Lint index for variety and year indicated [2] [3] [4]						
			Acala 4–42					R–15	
1st bloom	Cutout [1]	2d bloom	1952–2	1953–4	1954–1	1958–1	1959–2	1958–1	1959–2
Percent	*Percent*	*Percent*	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*
25	25	25		7.30 a	7.30 a				
35	35	35	7.62 a	7.28 a	7.39 a	7.74 a	7.78 a	6.19 b	6.59 a
50	50	50		7.25 a	7.42 a	7.69 a	7.77 a	6.31 b	6.40 ab
70	70	70	7.04 b	7.02 a	7.53 a				
80	80	80				7.74 a	7.39 b	6.57 a	6.24 b
100	100	100	6.54 c						
25	70	25			7.53 a				
50	35	35				7.78 a	7.80 a	6.34 b	6.58 a
35	70	70	7.37 ab	6.89 a					
50	80	80				7.82 a	7.46 b	6.60 a	6.32 ab
35	100	100	7.32 ab						
80	50	50				7.82 a	7.63 ab	6.69 a	6.48 ab

[1] Growth period during midseason (mid-July through mid-August) characterized by a decline in blossom production, boll set, and terminal growth.

[2] Lint index is weight of lint per 100 seed.

[3] Number after the year refers to experiment number.

[4] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 25.—*Seed index for Deltapine 15 cotton, as affected by rate of nitrogen application and moisture level, Thorsby, Ala., 1958*

Rate of N applied, pounds per acre	Seed index at moisture level of [1] [2] [3]—		
	M_1	M_2	M_3
	Grams	*Grams*	*Grams*
0	9.0 b	9.1 b	8.9 b
120	9.4 ab	9.5 a	9.3 ab
240	9.2 ab	9.3 ab	9.3 ab
360	9.6 a	9.5 a	9.4 a
Average	9.3 x	9.4 x	9.3 x

[1] Seed index is weight of 100 seed.

[2] M_1, no irrigation; M_2 and M_3, irrigated when 65 and 35 percent, respectively, of the available soil moisture was depleted from top 24 inches of soil.

[3] Values for rate of N for each moisture level followed by the same letter or letters or the averages for all N rates at each moisture level followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 26.—*Mean seed index for Acala 44 cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1958–61*

Date of flowering, week No.	Seed index for year and moisture regime indicated [1 2 3]									
	1958		1959		1960			1961		
	M	D	W	M	W	M	D	W	M	D
	Grams	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*
1	12.5	13.0	14.0	12.3	13.9	14.6	13.9	14.2	13.3	13.4
2	12.8	13.0	14.8	13.0	13.5	14.4	13.8	13.5	13.6	13.6
3	14.0	13.9	13.8	13.7	13.4	13.2	12.2	15.5	15.6	14.3
4	13.4	14.2	13.8	14.3	12.7	13.2	11.7	14.8	15.8	14.4
5	12.8	13.2	13.6	14.3	13.4	13.7	13.5	14.2	14.2	14.0
6	12.2	13.3	13.6	14.3	13.4	13.4	14.2	14.1	14.6	14.4
7	13.5	14.3	13.5	13.7	13.6	13.4	13.3	13.2	13.8	14.8
8	14.0	14.4	14.4	14.0	13.6	13.5	13.5	12.9	13.6	14.5
9	14.0	13.9	13.6	13.1	13.8	13.8	13.3	13.1	13.2	13.8
10	14.0	14.0	13.7	13.6	12.8	12.2	12.6	12.3	14.1	11.7
11	14.4	14.2	14.6	14.6	12.7	12.7	12.5	14.0	13.3	13.1
12	14.3	13.7	13.4	14.1	11.7	12.5	11.0	11.4	10.5	11.9
Mean	13.5	13.8	13.9	13.7	13.1	13.4	12.9	13.6	13.8	13.7

Water	**	NS	**	NS
Weeks	**	**	**	**
Water × weeks	NS	**	*	*
Duncan's multiple range test (5-percent):				
Water			0.23–0.28	
Weeks	0.64–0.72	0.56–0.66	.46– .53	0.32–0.95

[1] Seed index is weight of 100 seed.
[2] Moisture regimes: W, wet; M, medium; and D, dry.
[3] NS, no significant difference; *, 5-percent level of significance; **, 1-percent level of significance.

TABLE 27.—*Mean seed index for Pima S–1 cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1958–60*

Date of flowering, week No.	Seed index for year and moisture regime indicated [1 2 3]						
	1958		1959		1960		
	M	D	W	M	W	M	D
	Grams	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*
1	9.3	9.7	11.6	10.6	11.2	11.8	12.0
2	10.0	11.2	10.6	11.0	11.3	11.3	11.8
3	11.4	12.0	10.9	12.5	11.4	10.3	11.8
4	11.8	11.3	12.5	11.2	11.3	11.3	11.7
5	12.2	11.2	13.5	13.3	11.8	12.4	11.8
6	12.4	12.5	13.8	14.6	11.7	11.9	11.4
7	12.1	12.3	13.7	14.0	12.1	12.4	12.0
8	12.2	12.0	13.6	12.9	11.7	11.7	11.3
9	12.0	12.0	12.9	14.3	11.1	11.2	11.5
10	12.2	12.8	13.3	13.5	10.3	11.1	10.7
11	12.7	13.4	12.5	12.5	9.7	10.1	9.6
12	11.9	11.9	11.2	10.5	8.3	8.1	9.1
Mean	11.7	11.9	12.5	12.6	11.0	11.1	11.2
Water	*		NS		NS		
Weeks	**		**		**		
Water × weeks	**		NS		*		
Duncan's multiple range test (5-percent), weeks	0.43–0.48		0.96–1.11		0.49–0.56		

[1] Seed index is weight of 100 seed.
[2] Moisture regimes: W, wet; M, medium; and D, dry.
[3] NS, no significant difference; *, 5-percent level of significance; **, 1-percent level of significance.

TABLE 28.—*Mean seed index for Deltapine Smooth Leaf cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1961–62*

Date of flowering, week No.	Seed index for year and moisture regime indicated [1 2 3]				
	1961			1962	
	W	M	D	W	M
	Grams	*Grams*	*Grams*	*Grams*	*Grams*
1	10.4	11.3	9.9	10.6	10.4
2	9.7	9.8	9.8	9.9	10.0
3	9.4	9.5	9.8	9.7	9.1
4	9.7	11.0	9.2	9.5	8.6
5	9.2	10.0	9.4	9.3	9.0
6	9.3	9.7	10.2	9.4	8.1
7	9.6	10.1	11.0	9.3	8.8
8	10.4	10.6	10.6	8.9	10.0
9	9.4	10.1	9.9	8.7	10.0
10	10.0	9.6	9.2	8.9	10.2
11	10.7	9.4	9.2	9.5	10.4
12	9.4	8.6	7.2	10.4	10.3
Mean	9.8	10.0	9.6	9.5	9.6
Water		**		NS	
Weeks		**		**	
Water×weeks		**		*	
Duncan's multiple range test (5-percent):					
Water		0.30–0.37			
Weeks		.62– .70		0.79–0.86	

[1] Seed index is weight of 100 seed.
[2] Moisture regimes: W, wet; M, medium; and D, dry.
[3] NS, no significant difference; *, 5-percent level of significance; **, 1-percent level of significance.

TABLE 29.—*Seed index for 2 varieties of irrigated cotton, as affected by soil moisture regime and variety, Brawley, Calif., 1952–54, 1958–59*

Available soil moisture used at time of irrigations (0- to 24-inch depth)			Seed index for variety and year indicated [2] [3] [4]						
			Acala 4–42					R–15	
1st bloom	Cutout [1]	2d bloom	1952–2	1953–4	1954–1	1958–1	1959–2	1958–1	1959–2
Percent	*Percent*	*Percent*	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*
25	25	25		12.9 ab	13.2 a				
35	35	35	11.6 a	13.1 a	13.0 ab	13.0 ab	13.0 a	11.0 a	12.2 a
50	50	50		12.6 abc	13.0 ab	12.7 c	13.0 a	10.9 a	11.8 bc
70	70	70	11.0 c	12.4 bc	12.8 b				
80	80	80				12.8 bc	12.3 c	11.1 a	11.3 d
100	100	100	10.2 d						
25	70	25			13.3 a				
50	35	35				13.0 ab	12.9 a	11.0 a	12.1 ab
35	70	70	11.4 ab	12.2 c					
50	80	80				12.7 c	12.7 ab	11.2 a	11.8 bc
35	100	100	11.1 bc						
80	50	50				13.1 a	12.4 bc	11.2 a	11.6 cd

[1] Growth period during midseason (mid-July through mid-August) characterized by a decline in blossom production, boll set, and terminal growth.

[2] Seed index is weight of 100 seed.

[3] Number after the year refers to experiment number.

[4] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 30.—*Bolls per pound of seed cotton for 8 varieties of irrigated cotton, as affected by variety and plant topping, Thorsby, Ala., 1960–61*

Variety [1]	Bolls per pound for year and treatment indicated [2 3]					
	1960		1961		2-year average	
	T	U	T	U	T	U
	Number	*Number*	*Number*	*Number*	*Number*	*Number*
Stardel	83 c	83 d	78 d	80 d	81 c	82 c
Stoneville 7	81 c	82 d	73 cd	77 d	77 c	80 c
Empire	57 a	57 a	51 a	54 a	54 a	56 a
Coker 124 B	70 b	74 c	65 b	65 b	68 b	70 b
Auburn 56	71 b	67 b	68 bc	63 b	70 b	65 b
La DC–10	83 c	80 d	75 d	73 cd	79 c	77 c
Arizona Acala 44	60 a	60 a	52 a	54 a	56 a	57 a
Delta Queen	69 b	71 bc	66 b	66 bc	68 b	69 b
Average all varieties	72 x	72 x	66 x	67 x	69 x	70 x

[1] All varieties fertilized with 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually.

[2] T, plants topped at 48 inches when 51 inches high; U, plants not topped.

[3] Values in the same column followed by the same letter or letters or the averages of topped and not topped, by years, followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 31.—*Bolls per pound of seed cotton for 9 varieties of irrigated cotton, Thorsby, Ala., 1958–59*

Variety [1]	Bolls per pound [2]	
	1958	1959
	Number	*Number*
Deltapine 15	79 c	72 c
Stoneville 7	81 c	74 c
Empire	56 a	54 a
Coker 100–A	66 b	67 b
Rex	62 b	
Acala 4–42	56 a	54 a
Acala 44	54 a	52 a
Plains	64 b	65 b
Auburn 56		65 b

[1] All varieties fertilized with 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually. Irrigation applied uniformly to all varieties when 50 percent of available soil moisture was depleted from top 24 inches of soil.

[2] Values in the same column followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 32.—*Boll size (grams per boll) for 2 varieties of irrigated cotton, as affected by soil moisture regime and variety, Brawley, Calif., 1953–54, 1958–59*

Available soil moisture used at time of irrigations (0- to 24-inch depth)			Boll size for variety and year indicated [2,3]					
			Acala 4–42				R–15	
1st bloom	Cutout [1]	2d bloom	1953–4	1954–1	1958–1	1959–2	1958–1	1959–2
Percent	*Percent*	*Percent*	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*	*Grams*
25	25	25	6.50 a	6.61 ab				
35	35	35	6.29 ab	6.63 ab	6.16 a	5.69 a	5.69 a	5.13 a
50	50	50	5.92 bc	6.41 bc	5.79 c	5.52 ab	5.24 c	4.93 a
70	70	70	5.62 c	6.30 c				
80	80	80			5.70 c	5.17 c	5.37 bc	4.56 b
25	70	25		6.67 a				
50	35	35			6.04 ab	5.62 ab	5.69 a	5.10 a
35	70	70	5.85 bc					
50	80	80			5.80 c	5.37 bc	5.49 ab	4.86 a
80	50	50			5.91 bc	5.46 ab	5.53 ab	4.87 a

[1] Growth period during midseason (mid-July through mid-August) characterized by a decline in blossom production, boll set, and terminal growth.

[2] Number after the year refers to experiment number.

[3] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 33.—*Mean seeds per boll for Acala 44 cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1959–60*

Date of flowering, week No.	Seeds per boll for year and moisture regime indicated [1] [2]				
	1959		1960		
	W	M	W	M	D
	Number	*Number*	*Number*	*Number*	*Number*
1	27.7	30.4	32.4	29.8	27.1
2	27.5	25.5	32.0	32.0	30.8
3	28.7	26.6	34.2	33.1	34.5
4	27.2	25.6	31.1	32.8	33.4
5	29.2	27.4	31.0	31.8	30.9
6	27.2	24.3	30.3	29.3	30.4
7	33.2	31.1	30.8	32.3	29.9
8	30.0	28.8	28.2	34.1	31.1
9	30.9	31.7	30.5	32.1	31.6
10	33.5	29.9	33.9	32.9	34.0
11	32.6	30.9	33.1	34.3	33.0
12	33.3	33.7	32.8	34.5	32.3
Mean	30.1	28.8	31.7	32.5	31.6
Water	**		*		
Weeks	**		**		
Water × weeks	NS		*		
Duncan's multiple range test (5-percent):					
Water	2.01–2.34		0.72–0.89		
Weeks			1.46–1.70		

[1] Moisture regimes: W, wet; M, medium; and D, dry.
[2] NS, no significant difference; *, 5-percent level of significance; **, 1-percent level of significance.

TABLE 34.—*Mean seeds per boll for Pima S–1 cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1959–60*

Date of flowering, week No.	Seeds per boll for year and moisture regime indicated [1] [2]				
	1959		1960		
	W	M	W	M	D
	Number	*Number*	*Number*	*Number*	*Number*
1	9.3	8.6	15.5	14.3	12.5
2	12.3	11.7	18.4	16.3	14.7
3	13.0	9.8	18.2	16.9	16.9
4	13.4	10.2	18.9	17.5	17.4
5	10.6	12.2	15.5	16.0	15.3
6	11.9	10.0	15.0	14.7	13.0
7	14.4	14.3	14.0	15.5	12.8
8	14.9	14.4	18.4	16.7	12.2
9	19.2	19.2	19.0	17.6	17.5
10	19.1	18.6	19.3	18.8	19.3
11	18.2	17.6	18.7	20.2	18.6
12	18.3	18.0	18.5	19.4	18.4
Mean	14.6	13.7	17.5	17.0	15.7
Water	*		**		
Weeks	**		**		
Water×weeks	NS		NS		
Duncan's multiple range test (5-percent):					
Water	1.77–2.05		0.62–0.77		
Weeks			1.25–1.45		

[1] Moisture regimes: W, wet; M, medium; and D, dry.
[2] NS, no significant difference; *, 5-percent level of significance; **, 1-percent level of significance.

TABLE 35.—*Seeds per boll for 2 varieties of irrigated cotton, as affected by soil moisture regime and variety, Brawley, Calif., 1953–54, 1958–59*

Available soil moisture used at time of irrigations (0- to 24-inch depth)			Seeds per boll for variety and year indicated [2] [3]					
			Acala 4–42				R–15	
1st bloom	Cutout [1]	2d bloom	1953–4	1954–1	1958–1	1959–2	1958–1	1959–2
			Number	*Number*	*Number*	*Number*	*Number*	*Number*
25	25	25	32.2 a	32.2 a				
35	35	35	31.0 ab	32.4 a	29.7 a	27.3 a	33.2 a	27.2 a
50	50	50	29.9 bc	31.6 a	28.4 ab	26.6 a	30.3 b	27.1 a
70	70	70	29.2 c	31.0 a				
80	80	80			27.7 b	26.2 a	30.3 b	25.8 b
25	70	25		32.1 a				
50	35	35			28.9 ab	27.2 a	32.8 a	27.2 a
35	70	70	30.8 abc					
50	80	80			28.4 ab	26.4 a	30.8 b	26.6 ab
80	50	50			28.2 b	27.2 a	30.8 b	27.1 a

[1] Growth period during midseason (mid-July through mid-August) characterized by a decline in blossom production, boll set, and terminal growth.

[2] Number after the year refers to the experiment number.

[3] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 36.—*Fiber length and uniformity for irrigated cotton, as affected by rate of nitrogen and potassium applications, Thorsby, Ala., 1961–62*

[Stoneville 7 in 1961; Auburn 56 in 1962]

Rate of application [1]		Mean fiber length			Upper half mean fiber length			Fiber uniformity		
N	K	1961	1962	2-year average	1961	1962	2-year average	1961	1962	2-year average
Lb./acre	*Lb./acre*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Percent*	*Percent*	*Percent*
120	125	0.92 bcd	0.91 ab	0.92 bc	1.10 b	1.10 b	1.10 b	84 ab	83 a	84 a
120	250	.95 a	.92 a	.94 a	1.14 a	1.12 ab	1.13 a	84 ab	83 a	84 a
120	500	.95 a	.90 abc	.92 bc	1.13 ab	1.10 b	1.12 ab	84 ab	82 ab	83 ab
240	125	.93 abc	.90 abc	.92 bc	1.12 ab	1.11 ab	1.12 ab	83 ab	81 ab	82 ab
240	250	.94 ab	.92 a	.93 ab	1.13 ab	1.13 a	1.13 a	83 ab	82 ab	83 ab
240	500	.91 cd	.91 ab	.91 c	1.11 ab	1.13 a	1.12 ab	82 b	80 ab	81 b
360	125	.95 a	.90 abc	.93 ab	1.14 a	1.11 ab	1.12 ab	83 ab	81 ab	82 ab
360	250	.92 bcd	.91 ab	.92 bc	1.12 ab	1.12 ab	1.12 ab	81 bc	82 ab	82 ab
360	500	.92 bcd	.89 bc	.91 c	1.13 ab	1.10 b	1.12 ab	82 b	81 ab	82 ab
0	0	.89 d	.87 c	.90 c	1.08 bc	1.08 bc	1.08 bc	83 ab	80 ab	82 ab
0	500	.91 cd	.90 abc	.91 c	1.08 bc	1.10 b	1.09 bc	85 a	82 ab	84 a
360	0	.91 cd	.83 d	.87 d	1.11 ab	1.08 bc	1.10 b	83 ab	77 bc	80 bc

[1] All plots received 132 lb. of P per acre, annually. Irrigated when 50 percent of the available soil moisture was depleted from the top 24 inches of soil.

[2] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 37.—*Fiber length (mean and upper half mean (UHM)) for 8 varieties of irrigated cotton, as affected by variety and topping, Thorsby, Ala., 1960–61*

Variety [1]	Mean fiber length [2 3]					
	1960		1961		2-year average	
	T	U	T	U	T	U
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
Stardel	0.90 b	0.87 ab	0.97 a	0.98 b	0.94 ab	0.93 ab
Stoneville 7	.88 bc	.82 cd	.89 c	.94 c	.89 d	.88 d
Empire	.86 cd	.79 de	.94 b	.97 b	.90 cd	.88 d
Coker 124 B	.95 a	.83 c	.97 a	1.02 a	.96 a	.93 ab
Auburn 56	.84 d	.78 e	.95 ab	.89 d	.90 cd	.84 e
La DC–10	.89 bc	.88 a	.95 ab	.96 bc	.92 bc	.92 bc
Arizona Acala 44	.89 bc	.84 bc	.97 a	.95 c	.93 b	.90 cd
Delta Queen	.89 bc	.85 abc	.97 a	1.03 a	.93 b	.94 a
Average all varieties	.89 x	.83 y	.95 x	.97 x	.92 x	.90 x
	UHM fiber length [2 3]					
Stardel	1.11 b	1.10 a	1.19 ab	1.20 ab	1.15 bc	1.15 a
Stoneville 7	1.10 bc	1.05 bc	1.14 c	1.15 c	1.12 c	1.10 bc
Empire	1.10 bc	1.04 bc	1.17 bc	1.18 bc	1.14 bc	1.11 bc
Coker 124 B	1.16 a	1.06 b	1.12 a	1.22 a	1.19 a	1.14 ab
Auburn 56	1.09 bc	1.01 c	1.17 bc	1.14 cd	1.13 bc	1.08 c
La DC–10	1.07 c	1.05 bc	1.14 c	1.15 c	1.11 cd	1.10 bc
Arizona Acala 44	1.11 b	1.06 ab	1.19 ab	1.17 bc	1.15 bc	1.12 b
Delta Queen	1.11 b	1.09 ab	1.19 ab	1.21 ab	1.15 bc	1.15 a
Average all varieties	1.11 x	1.06 y	1.18 x	1.18 x	1.14 x	1.12 y

[1] All varieties fertilized with 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually.

[2] T, plants topped at 48 inches when 51 inches high; U, plants not topped.

[3] For each characteristic, values in the same column followed by the same letter or letters or the averages of topped and not topped, by years, followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 38.—*Fiber length (mean and upper half mean (UHM)) for Auburn 56 cotton, as affected by topping and side-branch pruning, Thorsby, Ala., 1960–61*

[Plant population—2 or 3 per foot]

Treatment [1]	Mean fiber length [2]			
	1960		1961	
	1st harvest	Average	1st harvest	Average
	Inches	*Inches*	*Inches*	*Inches*
Check	0.81 c	0.90 a	0.84 cd	0.89 b
Side branches pruned	.87 bc	.88 ab	.92 b	.91 a
Topped at 36 inches when 39 inches high	.78 c	.85 ab	.76 c	.85 d
Topped at 42 inches when 45 inches high	.92 b	.89 ab	.87 bcd	.86 cd
Topped at 48 inches when 51 inches high	1.01 a	.90 a	1.03 a	.91 a
Topped at 42 inches, side branches pruned	.85 bc	.88 ab	.93 b	.87 c
Topped at 48 inches, side branches pruned	.91 bc	.81 b	.90 bc	.89 b
Topped at 42 inches when 52 inches high	.86 bc	.86 ab	.81 de	.89 b
	UHM fiber length [2]			
Check	1.06 d	1.10 a	1.10 b	1.11 abc
Side branches pruned	1.07 d	1.07 b	1.10 b	1.13 a
Topped at 36 inches when 39 inches high	1.07 d	1.07 b	1.02 c	1.09 c
Topped at 42 inches when 45 inches high	1.13 bc	1.10 a	1.08 b	1.09 c
Topped at 48 inches when 51 inches high	1.18 a	1.10 a	1.17 a	1.12 ab
Topped at 42 inches, side branches pruned	1.11 c	1.10 a	1.16 a	1.12 ab
Topped at 48 inches, side branches pruned	1.15 b	1.05 b	1.09 b	1.10 bc
Topped at 42 inches when 52 inches high	1.15 b	1.10 a	1.09 b	1.12 ab

[1] All plots received 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually. Irrigated when 50 percent of the available water was depleted from the top 24 inches of soil.

[2] Values for mean fiber length or those for UHM fiber length in same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 39.—*Mean fiber length for 2 varieties of irrigated cotton, as affected by soil moisture regime, variety and date of flowering, Tempe, Ariz., 1958-62*

Date of flowering, week No.	Mean fiber length for variety, year, and moisture regime indicated [1] [2]														
	Acala 44										Deltapine Smooth Leaf				
	1958		1959		1960			1961			1961			1962	
	M	D	W	M	W	M	D	W	M	D	W	M	D	W	M
	Inch	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*
1	0.75	0.76	0.76	0.74	0.73	0.73	0.81	0.63	0.65	0.81	0.78	0.77	0.70	0.82	0.71
2	.80	.80	.78	.79	.76	.79	.72	.67	.71	.74	.77	.74	.70	.74	.74
3	.82	.83	.80	.81	.71	.73	.75	.86	.82	.79	.72	.75	.69	.73	.66
4	.82	.81	.80	.79	.73	.73	.78	.81	.80	.83	.78	.81	.67	.66	.65
5	.75	.76	.85	.81	.76	.81	.81	.83	.88	.89	.74	.73	.71	.68	.65
6	.72	.77	.80	.83	.78	.86	.86	.78	.79	.84	.72	.74	.76	.69	.67
7	.79	.80	.80	.82	.80	.83	.81	.73	.77	.82	.74	.75	.82	.68	.69
8	.82	.83	.81	.83	.80	.88	.80	.76	.78	.85	.75	.77	.70	.68	.75
9	.85	.84	.82	.75	.79	.85	.87	.83	.80	.83	.76	.72	.73	.68	.75
10	.84	.84	.84	.81	.76	.72	.78	.72	.78	.81	.73	.77	.76	.72	.64
11	.86	.86	.89	.89	.77	.73	.80	.74	.71	.84	.73	.66	.65	.62	.66
12	.84	.82	.73	.76	.74	.81	.72	.64	.64	.71	.62	.61	.53	.65	.68
Mean	.81	.81	.81	.80	.76	.79	.79	.75	.76	.81	.74	.74	.70	.70	.69

Water	NS	NS	**	**	**	NS
Weeks	**	**	**	**	**	*
Water × weeks	NS	NS	NS	NS	NS	NS
Duncan's multiple range test (5-percent):						
Water			0.025–0.031	0.023–0.029	0.028–0.034	0.075–0.082
Weeks	0.033–0.038	0–048–0.055	.051– .059	.047– .055	.057– .065	

[1] Moisture regimes: W, wet; M, medium; and D, dry.
[2] NS, no significant difference; *, 5-percent level of significance; **, 1-percent level of significance.

TABLE 40.—*Fiber and spinning properties for 4 varieties of irrigated cotton, as affected by rate of nitrogen application, Brawley, Calif., 1959–60*

Variety	Rate of N applied	Upper half mean fiber length [1 2]		Mean fiber length [1 2]		Fiber uniformity [1 2]	
		1959–1	1960–1	1959–1	1960–1	1959–1	1960–1
	Lb./acre	*Inch*	*Inch*	*Inch*	*Inch*	*Percent*	*Percent*
Acala 4–42	0	1.12 a	1.12 c	0.97 a	0.96 cd	87 ab	86 ab
	120	1.11 a	1.12 c	.98 a	.98 d	88 b	87 b
	240	1.12 a	1.11 c	.98 a	.96 cd	87 ab	86 ab
	360	1.10 a	1.11 c	.97 a	.95 bcd	88 b	86 ab
	Mean	1.10 x	1.12 y	.97 x	.96 y	88 y	87 y
R–15	0	1.09 a	1.07 ab	.95 a	.92 ab	87 ab	86 ab
	120	1.10 a	1.06 a	.96 a	.92 ab	88 b	86 ab
	240	1.10 a	1.07 ab	.95 a	.93 abc	86 ab	86 ab
	360	1.11 a	1.06 a	.96 a	.91 a	87 ab	86 ab
	Mean	1.10 x	1.07 x	.95 x	.92 *0*	87 x	86 xy
Deltapine 15 (1959)	0	1.10 a	1.11 c	.93 a	.94 abc	85 ab	85 ab
	120	1.11 a	1.10 bc	.94 a	.93 abc	85 ab	84 a
Deltapine Smooth Leaf (1960).	240	1.12 a	1.10 bc	.94 a	.93 abc	84 a	85 ab
	360	1.12 a	1.10 bc	.94 a	.93 abc	84 a	84 a
	Mean	1.12 x	1.10 y	.94 x	.93 x	84 x	85 x

Variety	Rate of N applied	Micronaire [1] [2]		Fiber strength (T_1) [1] [2]		Yarn strength, 22's lb., 1959–1 [1] [2]	Neps grade, 1959–1 [1] [2]
		1959–1	1960–1	1959–1	1960–1		
	Lb./acre			*G./grex*	*G./grex*		
Acala 4–42	0	4.32 a	4.34 a	2.48 e	2.69 c	153.6 cd	1.0 a
	120	4.58 bcd	4.53 b	2.36 cde	2.72 c	152.6 cd	1.0 a
	240	4.43 ab	4.59 b	2.43 d	2.72 c	149.4 c	1.4 a
	360	4.55 bc	4.62 bc	2.39 cde	2.76 c	151.4 cd	1.6 a
	Mean	4.46 x	4.52 x	2.42 y	2.72 z	151.8 y	1.2 y
R–15	0	4.78 e	4.67 bcd	2.25 c	2.41 b	150.6 c	1.2 a
	120	4.79 e	4.90 e	2.31 cd	2.38 b	153.0 cd	1.0 a
	240	4.79 e	4.86 de	2.42 de	2.44 b	153.6 cd	1.4 a
	360	4.86 cde	4.84 de	2.42 de	2.50 b	155.8 d	1.8 a
	Mean	4.75 y	4.82 y	2.35 y	2.43 y	153.2 y	1.4 x
Deltapine 15 (1960)	0	4.80 e	4.69 bcd	1.87 a	2.06 a	122.0 a	1.4 a
	120	4.83 e	4.98 e	2.03 b	2.07 a	124.8 ab	1.6 a
Deltapine Smooth Leaf (1960).	240	4.79 e	4.92 e	1.92 ab	2.09 a	126.6 b	1.6 a
	360	4.75 de	4.82 cde	1.93 ab	2.12 a	127.2 b	1.4 a
	Mean	4.79 y	4.85 y	1.94 x	2.08 x	125.2 x	1.5 x

[1] Number after the year refers to experiment number.

[2] Values for rate of N for each variety, by boll property and year, followed by the same letter or letters or the average of all N rates for each variety, by boll property and year, followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 41.—*Mean fiber length for 2 varieties of irrigated cotton, as affected by soil moisture regime and variety, Brawley, Calif., 1952–54, 1958–59*

Available soil moisture used at time of irrigations (0- to 24-inch depth)			Mean fiber length for variety and year indicated [2] [3]						
			Acala 4–42					R–15	
1st bloom	Cutout [1]	2d bloom	1952–2	1953–1	1954–1	1958–1	1959–2	1958–1	1959–2
Percent	*Percent*	*Percent*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*
25	25	25		0.99 a	0.96 a				
35	35	35	0.88 a	.99 a	.96 a	0.97 ab	0.93 a	0.92 a	0.92 a
50	50	50		.96 a	.95 ab	.95 bc	.93 abc	.90 abc	.94 a
70	70	70	.85 ab	.96 a	.94 b				
80	80	80				.94 c	.92 a	.89 bc	.94 a
100	100	100	.82 b						
25	25	75			.96 a				
50	35	35				.98 a	.91 a	.91 ab	.94 a
35	70	70	.87 a	.94 a					
50	80	80				.96 abc	.91 a	.88 c	.93 a
35	100	100	.86 a						
80	50	50				.96 abc	.93 a	.90 abc	.94 a

[1] Growth period during midseason (mid-July through mid-August) characterized by a decline in blossom production, boll set, and terminal growth.

[2] Number after the year refers to experiment number.

[3] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 42.—*Upper half mean (UHM) fiber length for 9 varieties of irrigated cotton, Thorsby, Ala., 1958–59*

Variety [1]	Fiber length (UHM) [2]		
	1958	1959	2-year average
	Inches	*Inches*	*Inches*
Deltapine 15	1.07 ab	1.09 a	1.08 a
Stoneville 7	1.05 bc	1.07 ab	1.06 b
Empire	1.09 a	1.06 ab	1.08 a
Coker 100–A	1.09 a	1.07 ab	1.08 a
Rex	1.08 ab	----------	----------
Acala 4–42	1.06 b	1.07 ab	1.07 ab
Acala 44	1.07 ab	1.08 ab	1.08 a
Plains	1.07 ab	1.05 b	1.06 b
Auburn 56	----------	1.05 b	----------

[1] All varieties fertilized with 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually. Irrigation applied uniformly to all varieties when 50 percent of available soil moisture was depleted from top 24 inches of soil.

[2] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 43.—*Upper half mean (UHM) fiber length for Acala 44 cotton as affected by soil moisture regime and flowering date, Tempe, Ariz., 1958–61*

Date of flowering, week No.	Fiber length for year and moisture regime indicated [1] [2]									
	1958		1959		1960			1961		
	M	D	W	M	W	M	D	W	M	D
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
1	0.99	1.02	1.06	1.01	1.02	1.02	1.07	0.94	0.94	1.05
2	1.02	1.02	1.07	1.04	1.03	1.04	1.00	.97	1.01	1.01
3	1.08	1.08	1.07	1.09	.96	1.04	1.00	1.14	1.13	1.06
4	1.06	1.06	1.06	1.08	.97	1.05	1.01	1.11	1.10	1.09
5	1.01	1.01	1.10	1.09	1.02	1.07	1.05	1.12	1.13	1.11
6	.97	1.02	1.08	1.11	1.03	1.10	1.10	1.09	1.11	1.12
7	1.06	1.08	1.07	1.09	1.05	1.09	1.06	1.04	1.08	1.12
8	1.08	1.08	1.11	1.11	1.06	1.12	1.07	1.04	1.09	1.12
9	1.08	1.08	1.08	1.04	1.05	1.11	1.09	1.09	1.10	1.11
10	1.07	1.08	1.10	1.08	1.01	1.00	1.05	1.06	1.09	1.08
11	1.12	1.08	1.14	1.15	1.00	1.01	1.06	1.05	1.05	1.12
12	1.10	1.08	1.05	1.10	1.00	1.07	.99	.96	.92	1.04
Mean	1.05	1.06	1.08	1.08	1.02	1.06	1.05	1.05	1.06	1.09

Water	NS	NS	**	**
Weeks	**	**	**	**
Water × weeks	NS	NS	NS	**
Duncan's multiple range test (5-percent):				
Water			0.019–0.023	0.016–0.020
Weeks	0.031–0.035	0.032–0.037	.038– .044	.032– .037

[1] Moisture regimes: W, wet; M, medium; and D, dry.
[2] NS, no significant differences; **, 1-percent level of significance.

TABLE 44.—*Upper half mean (UHM) fiber length for 2 varieties of irrigated cotton, as affected by soil moisture regime, Brawley, Calif., 1952–54, 1958–59*

Available soil moisture used at time of irrigations (0- to 24-inch depth)			Fiber length (UHM) for variety and year indicated [2] [3]						
			Acala 4–42					R–15	
1st bloom	Cutout [1]	2d bloom	1952–2	1953–4	1954–1	1958–1	1959–2	1958–1	1959–2
Percent	*Percent*	*Percent*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
25	25	25		1.17 a	1.12 ab				
35	35	35	1.07 a	1.17 a	1.13 a	1.11 ab	1.09 a	1.05 a	1.09 a
50	50	50		1.15 ab	1.12 ab	1.10 ab	1.09 a	1.03 ab	1.10 a
70	70	70	1.03 b	1.14 ab	1.11 b				
80	80	80				1.09 b	1.03 a	1.02 b	1.10 a
100	100	100	1.00 c						
25	70	25			1.13 a				
50	35	35				1.12 a	1.06 a	1.04 ab	1.10 a
35	70	70	1.06 a	1.12 b					
50	80	80				1.10 ab	1.07 a	1.02 b	1.08 a
35	100	100	1.05 ab						
80	50	50				1.11 ab	1.08 a	1.03 ab	1.10 a

[1] Growth period during midseason (mid-July through mid-August) characterized by a decline in blossom production, boll set, and terminal growth.

[2] Number after the year refers to experiment number.

[3] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 45.—*Fiber uniformity for Stoneville 7 cotton, as affected by rate of potassium application and picking dates, Thorsby, Ala., 1960*

Rate of K applied, pounds per acre [1]	Fiber uniformity when cotton was picked on [2]				Average
	Sept. 8	Sept. 20	Oct. 13	Oct. 26	
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
0	0.79 ab	0.79 c	0.76 c	0.76 cd	0.78 bc
62.5	.79 ab	.82 ab	.84 a	.86 a	.83 a
125	.78 bc	.84 a	.84 a	.79 bc	.81 ab
250	.76 c	.80 bc	.82 ab	.83 ab	.80 ab
375	.71 d	.82 ab	.77 c	.81 b	.79 b
500	.81 a	.78 c	.79 bc	.75 d	.78 bc

[1] All plots received 360 lb. of N and 132 lb. of P per acre, annually.

[2] Values in the same column or for the same rate of K followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 46.—*Mean fiber uniformity for Acala 44 cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1958–61*

Date of flowering, week No.	Fiber uniformity for year and moisture regime indicated [1 3]									
	1958		1959		1960			1961		
	M	D	W	M	W	M	D	W	M	D
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
1	75.8	75.0	71.5	73.6	71.5	71.3	75.6	67.6	69.1	77.5
2	78.8	78.4	72.9	76.5	73.2	75.6	72.6	69.2	70.0	73.0
3	75.3	77.2	74.4	74.6	74.2	70.5	75.2	75.2	72.3	74.6
4	77.0	76.0	75.6	73.1	75.5	69.5	77.1	72.4	72.2	76.6
5	74.3	75.2	77.5	74.0	74.2	75.7	77.5	74.5	78.1	79.9
6	73.4	75.1	73.8	75.1	75.1	77.6	78.7	71.0	70.5	75.1
7	74.7	74.1	74.6	74.7	75.6	75.9	76.5	70.0	71.6	73.0
8	76.1	77.2	72.0	74.2	75.5	78.8	74.8	72.9	72.1	75.8
9	78.9	78.2	76.0	71.8	74.7	76.3	79.7	76.4	72.6	74.5
10	79.0	77.8	76.5	75.5	75.6	72.8	74.8	68.4	71.8	74.9
11	78.4	78.8	78.0	76.8	76.4	71.9	75.7	70.0	67.7	75.0
12	76.0	76.2	69.6	69.6	74.0	76.0	73.1	67.6	69.0	68.1
Mean	76.5	76.6	74.4	74.1	74.6	74.3	75.9	71.3	71.4	74.8

Water	NS	NS	*	**
Weeks	**	**	NS	**
Water × weeks	NS	NS	NS	NS
Duncan's multiple range test (5-percent):				
Water			1.51–1.85	1.61–1.97
Weeks	1.76–1.99	2.99–3.48		3.23–3.74

[1] Moisture regimes: W, wet; M, medium; and D, dry.
[2] NS, no significant difference; *, 5-percent level of significance; **, 1-percent level of significance.

TABLE 47.—*Mean fiber uniformity for Pima S–1 cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1958–60*

Date of flowering, week No.	Fiber uniformity for year and moisture regime indicated [1] [2]						
	1958		1959		1960		
	M	D	W	M	W	M	D
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
1	84.3	84.7	85.0	86.3	85.8	87.5	85.2
2	84.8	85.0	85.1	85.0	85.4	87.2	86.7
3	84.7	85.8	85.3	86.4	86.5	88.0	87.4
4	84.9	86.0	86.0	86.4	86.5	88.0	87.1
5	84.2	85.6	86.2	87.2	86.8	87.9	87.5
6	85.5	86.2	85.7	86.7	87.6	89.0	88.0
7	85.7	85.8	87.0	87.9	87.7	89.6	87.6
8	86.0	86.6	86.8	86.1	86.0	88.2	85.1
9	86.2	86.6	86.7	86.5	86.9	88.2	89.1
10	86.1	85.9	86.4	86.7	86.1	86.7	88.4
11	85.4	85.9	85.4	85.6	86.4	87.0	86.7
12	84.9	84.9	84.0	83.9	85.4	87.6	85.4
Mean	85.2	85.8	85.8	86.2	86.4	87.9	87.0

Water	**	NS	**
Weeks	**	**	**
Water×weeks	NS	NS	*
Duncan's multiple range test (5-percent):			
Water			0.39–0.48
Weeks	0.73–0.82	1.05–1.22	.79– .91

[1] Moisture regimes: W, wet; M, medium; and D, dry.
[2] NS, no significant difference; *, 5-percent level of significance; **, 1-percent level of significance.

TABLE 48.—*Mean fiber uniformity for Deltapine Smooth Leaf cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1961–62*

Date of flowering, week No.	Fiber uniformity for year and moisture regime indicated [1] [2]				
	1961			1962	
	W	M	D	W	M
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
1	73.1	70.4	69.5	75.1	67.9
2	72.3	72.9	70.6	66.2	68.5
3	71.6	78.2	66.7	67.7	64.9
4	72.1	72.0	68.2	63.6	66.6
5	71.8	70.1	72.6	66.7	65.6
6	70.7	71.8	73.4	66.0	69.6
7	70.5	72.1	75.9	65.5	69.4
8	69.4	72.4	66.7	65.3	68.2
9	71.7	67.6	69.5	61.8	68.2
10	63.2	73.3	72.2	65.5	62.4
11	68.9	65.0	62.7	62.0	62.3
12	62.0	66.1	61.8	65.0	64.9
Mean	70.2	71.0	69.2	65.9	66.5
Water		*		NS	
Weeks		**		**	
Water × weeks		NS		NS	
Duncan's multiple range test (5-percent):					
Water		1.80–2.19			
Weeks		3.64–4.16		3.80–4.17	

[1] Moisture regimes: W, wet; M, medium; and D, dry.
[2] NS, no significant difference; *, 5-percent level of significance; **, 1-percent level of significance.

TABLE 49.—*Fiber strength for 2 varieties of cotton, as affected by rate of nitrogen application and moisture level, Thorsby, Ala., 1956–59*

[Coker 100–A in 1956 and 1957 and Deltapine 15 in 1958 and 1959]

Moisture level and rate of N application, pounds per acre [1]	(T_0) [2]	(T_1) [2 3]			
	1956	1956	1957	1958	1959
	G./grex	*G./grex*	*G./grex*	*G./grex*	*G./grex*
M_1:					
0	3.75 b	1.79 a	1.68 ab	1.74 a	1.77 a
60	3.80 ab	1.76 ab	1.70 ab		
120	3.68 c	1.70 b	1.72 a	1.60 b	1.75 a
240	3.83 a	1.77 ab	1.62 b	1.69 ab	1.75 a
360				1.58 bc	1.64 b
Average	3.77 x	1.76 x	1.68 x	1.65 x	1.73 x
M_2:					
0	3.33 a	1.60 a	1.58 a	1.72 a	1.43 ab
60	3.24 bc	1.58 a	1.64 a		
120	3.25 b	1.57 a	1.55 a	1.52 c	1.34 c
240	3.19 c	1.61 a	1.55 a	1.65 ab	1.41 b
360				1.58 bc	1.51 a
Average	3.25 y	1.59 y	1.58 y	1.62 x	1.42 y
M_3:					
0	3.32 a	1.76 a	1.64	1.65 ab	1.56 ab
60	3.26 ab	1.72 ab	1.61		
120	3.28 ab	1.66 b	1.60	1.56 bc	1.53 ab
240	3.24 b	1.69 ab	1.58	1.70 a	1.52 ab
360				1.52 bc	1.57 ab
480					1.51 b
720					1.59 a
Average	3.28 y	1.71 xy	1.61 xy	1.61 x	1.55 y

[1] M_1, no irrigation; M_2 and M_3, irrigated when 65 and 35 percent, respectively, of the available soil moisture was depleted from the surface 24 inches of soil.

[2] For explanation of (T_0) and (T_1), see p. 7.

[3] Values for rate of N for each moisture level, by years, followed by the same letter or letters or the averages for all N rates at each moisture level, by years, followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 50.—*Fiber strength (T_1) for Stoneville 7 cotton, as affected by rate of potassium application and harvest date, Thorsby, Ala., 1960*

Rate of K applied, pounds per acre [1]	Fiber strength (T_1) when cotton was picked on [2 3]—				Average
	Sept. 8	Sept. 20	Oct. 13	Oct. 26	
	G./grex	*G./grex*	*G./grex*	*G./grex*	*G./grex*
0	1.62 ab	1.54 bc	1.34 c	1.45 ab	1.49 ab
62.5	1.64 a	1.58 bc	1.53 a	1.49 ab	1.56 ab
125	1.56 b	1.70 a	1.51 ab	1.49 ab	1.57 a
250	1.28 cd	1.61 b	1.44 b	1.53 a	1.47 b
375	1.28 cd	1.48 c	1.45 ab	1.53 a	1.44 bc
500	1.31 c	1.52 bc	1.46 ab	1.43 b	1.43 bc
Average	1.45 z	1.57 x	1.45 z	1.49 y	

[1] All plots received 360 lb. of N and 132 lb. of P per acre, annually.
[2] For explanation of (T_1), see p. 7.
[3] Values in the same column followed by the same letter or letters or the averages for all K rates at each harvest date followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 51.—*Fiber strength (T_1) for 8 varieties of irrigated cotton, as affected by variety and topping, Thorsby, Ala., 1960–61*

Variety [1]	Fiber strength (T_1) for year and treatment indicated [2 3 4]					
	1960		1961		2-year average	
	T	U	T	U	T	U
	G./grex	*G./grex*	*G./grex*	*G./grex*	*G./grex*	*G./grex*
Stardel	1.78 a	1.74 a	1.88 a	1.86 a	1.83 a	1.80 a
Stoneville 7	1.60 bc	1.51 c	1.73 b	1.67 d	1.67 c	1.59 d
Empire	1.60 bc	1.58 bc	1.76 b	1.74 cd	1.68 c	1.66 cd
Coker 124 B	1.67 bc	1.49 c	1.75 b	1.75 bcd	1.71 c	1.62 cd
Auburn 56	1.59 c	1.55 c	1.73 b	1.70 d	1.66 c	1.63 cd
La DC–10	1.66 bc	1.69 ab	1.78 b	1.61 abc	1.72 bc	1.75 ab
Arizona Acala 44	1.68 b	1.53 c	1.92 a	1.82 ab	1.80 ab	1.63 bc
Delta Queen	1.61 bc	1.51 c	1.74 b	1.71 d	1.68 c	1.61 cd
Average all varieties	1.65 x	1.58 y	1.79 x	1.76 x	1.72 x	1.67 y

[1] All varieties fertilized with 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually.
[2] For explanation of (T_1), see p. 7.
[3] T, plants topped at 48 inches when 51 inches high; U, plants not topped.
[4] Values in the same column followed by the same letter or letters or the averages of topped and not topped, by years, followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 52.—*Fiber strength (T_1) for 9 varieties of irrigated cotton, as affected by variety and year, Thorsby, Ala., 1958–59*

Variety [1]	Fiber strength (T_1) [2 3]		
	1958	1959	2-year average
	G./grex	*G./grex*	*G./grex*
Deltapine 15	1.67 a	1.54 bc	1.61 a
Stoneville 7	1.46 c	1.45 cd	1.46 b
Empire	1.51 c	1.45 cd	1.48 b
Coker 100–A	1.54 bc	1.42 d	1.48 b
Rex	1.52 c	----	----
Acala 4–42	1.62 ab	1.65 a	1.64 a
Acala 44	1.62 ab	1.60 ab	1.61 a
Plains	1.53 bc	1.46 cd	1.50 b
Auburn	----	1.43 d	----
Average all varieties	1.56	1.50	----

[1] All varieties fertilized with 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually. Irrigation applied uniformly to all varieties when 50 percent of available soil moisture was depleted from top 24 inches of soil.

[2] For explanation of (T_1), see p. 7.

[3] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 53.—*Mean fiber strength for Acala 44 cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1958–61*

Date of flowering, week No.	Fiber strength for year and moisture regime indicated [1] [2]									
	1958		1959		1960			1961		
	M	D	W	M	W	M	D	W	M	D
	Pressley index	*Pressley index*	*Pressley index*	*Pressley index*	*Pressley index*	*Pressley index*	*Pressley index*	*Pressley index*	*Pressley index*	*Pressley index*
1	3.44	3.68	3.38	3.61	3.25	2.84	3.19	2.66	2.97	3.59
2	3.50	3.49	3.49	3.63	3.30	3.17	3.03	2.78	2.85	3.07
3	3.59	3.54	3.72	3.88	3.07	3.16	3.07	3.49	3.48	3.39
4	3.45	3.42	3.42	3.42	3.28	3.32	3.22	3.47	3.47	3.53
5	3.40	3.33	3.64	3.68	3.33	3.24	3.23	3.53	3.49	3.64
6	3.26	3.26	3.32	3.71	3.59	3.47	3.55	3.35	3.46	3.71
7	3.47	3.51	3.44	3.54	3.43	3.43	3.30	3.34	3.38	3.67
8	3.48	3.50	3.57	3.59	3.76	3.65	3.38	3.32	3.54	3.58
9	3.59	3.51	3.57	3.38	3.46	3.48	3.37	3.15	3.19	3.55
10	3.38	3.34	3.57	3.44	3.27	3.27	3.26	3.50	3.55	3.26
11	3.42	3.32	3.40	3.49	3.16	3.25	3.32	3.36	3.49	3.49
12	3.27	3.15	3.52	3.00	3.55	3.60	3.39	3.22	3.22	3.36
Mean	3.44	3.42	3.58	3.58	3.37	3.32	3.28	3.26	3.34	3.49

Water	NS	*	*	**
Weeks	**	**	**	**
Water × weeks	NS	NS	**	*
Duncan's multiple range test (5-percent):				
Water			0.066–0.081	0.098–0.120
Weeks	0.11–0.13	0.15–0.18	.133– .154	.196– .227

[1] Moisture regimes: W, wet; M, medium; and D, dry.
[2] NS, no significant difference; *, 5-percent level of significance; **, 1-percent level of significance.

TABLE 54.—*Mean fiber strength for Pima S–1 cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1958–60*

Date of flowering, week No.	Fiber strength for year and moisture regime indicated [1] [2]						
	1958		1959		1960		
	M	D	W	M	W	M	D
	G./grex	*G./grex*	*G./grex*	*G./grex*	*G./grex*	*G./grex*	*G./grex*
1	31.5	31.7	30.8	31.2	29.7	31.3	29.9
2	30.4	30.4	30.5	29.6	31.7	31.8	32.0
3	30.4	30.2	31.0	29.5	31.3	32.0	31.1
4	30.7	30.9	29.9	29.7	31.2	31.8	30.9
5	29.6	31.6	31.0	30.6	32.9	32.1	32.4
6	29.6	31.4	29.3	28.4	32.8	32.8	32.9
7	30.3	32.2	30.8	30.5	31.4	32.0	31.5
8	30.9	32.0	31.3	30.4	33.5	33.4	33.7
9	30.5	31.2	30.2	30.2	33.4	34.4	31.9
10	30.8	31.0	30.5	31.3	32.6	33.0	31.9
11	30.7	30.9	30.3	30.5	33.5	34.1	33.1
12	32.2	33.5	34.9	34.0	33.1	34.3	32.7
Mean	30.6	31.4	30.9	30.5	32.3	32.7	32.0
Water	**		NS		**		
Weeks	**		**		**		
Water×weeks	NS		NS		NS		
Duncan's multiple range test (5-percent):							
Water					0.36–0.44		
Weeks	0.85–0.94		1.09–1.27		.72– .84		

[1] Moisture regimes: W, wet; M, medium; and D, dry.
[2] NS, no significant difference; **, 1-percent level of significance.

TABLE 55.—*Mean fiber strength for Deltapine Smooth Leaf cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1961–62*

Date of flowering, week No.	Fiber strength for year and moisture regime indicated [1] [2]				
	1961			1962	
	W	M	D	W	M
	Pressley index	*Pressley index*	*Pressley index*	*Pressley index*	*Pressley index*
1	3.50	3.71	3.49	3.24	3.12
2	3.29	3.41	3.15	3.38	3.24
3	3.13	3.18	3.20	3.04	3.05
4	3.31	3.24	3.16	3.18	2.94
5	3.09	3.16	3.04	2.99	2.99
6	3.16	3.07	3.17	3.01	2.69
7	3.24	3.16	3.30	3.04	2.86
8	3.33	3.24	3.16	2.94	3.14
9	3.27	3.41	3.10	2.91	3.14
10	3.22	3.00	3.05	3.00	3.14
11	3.07	3.21	3.32	2.78	3.09
12	3.39	3.10	3.06	3.18	3.29
Mean	3.25	3.24	3.18	3.06	3.06
Water		NS			NS
Weeks		**			**
Water×weeks		NS			NS
Duncan's multiple range test (5 percent), weeks		0.174–0.200			0.22–0.24

[1] Moisture regimes: W, wet; M, medium; and D, dry.
[2] NS, no significant differences; **, 1-percent level of significance.

TABLE 56.—*External surface area "A" and fiber flatness "D" for Coker 100–A cotton fiber, as affected by rate of nitrogen application and moisture level, Thorsby, Ala., 1956–57*

Moisture level and rate of N application, pounds per acre [1]	External surface area "A" [2]		Fiber flatness "D" [2]	
	1956	1957	1956	1957
M_1:	$Mm.^2/mm.^3$	$Mm^2/mm.^3$	$Mm.^2/mm.^3$	$Mm.^2/mm.^3$
0	492 a	490 a	47 ab	35 ab
60	506 a	467 b	48 ab	34 b
120	495 a	490 a	44 b	41 a
240	518 a	501 a	52 a	41 a
Average	503 y	487 x	48 y	38 x
M_2:				
0	520 a	451 a	52 b	28 a
60	504 a	455 a	45 c	32 a
120	511 a	456 a	55 ab	32 a
240	517 a	470 b	58 a	34 a
Average	513 xy	458 y	53 xy	32 y
M_3:				
0	563 a	465 a	60 a	32 a
60	540 ab	465 a	60 a	32 a
120	543 ab	474 a	57 a	36 a
240	521 b	468 a	55 a	37 a
Average	542 x	468 xy	58 x	34 xy

[1] M_1, no irrigation; M_2 and M_3, irrigated when 65 and 35 percent, respectively, of the available soil moisture was depleted from the surface 24 inches of soil.

[2] For each characteristic, the values for rate of N for each moisture level, by years, followed by the same letter or letters or the averages for all N rates at each moisture level, by years, followed by the same letter or letters are not significantly different at 5-percent level according to Duncan's multiple range test.

TABLE 57.—*External surface area "A," fiber flatness "D," and fiber elongation (E_1) for 2 varieties of irrigated cotton, as affected by soil moisture regime, Brawley, Calif., 1954, 1958–59*

Available soil moisture used at time of irrigations (0- to 24-inch depth)			External surface area "A" [3,4]			Fiber flatness "D" [3,4]			Fiber elongation (E_1)[2,3,4]		
1st bloom	Cutout[1]	2d bloom	Acala 4–42		R–15	Acala 4–42		R–15	Acala 4–42		R–15
			1954–1	1958–1	1958–1	1954–1	1958–1	1959–2	1954–1	1958–1	1959–2
Percent	*Percent*	*Percent*	*Mm.²/mm.³*	*Mm.²/mm.³*	*Mm.²/mm.³*	*Mm.²/mm.³*	*Mm.²/mm.³*	*Mm.²/mm.³*	*Percent*	*Percent*	*Percent*
25	25	25	475 a			45 ab			4.8 a		
35	35	35	482 a	436 ab	412 a	46 a	22 a	20 a	7.6 a	6.4 a	6.1 a
50	50	50	479 a	436 ab	402 ab	47 a	22 a	18 ab	7.6 a	6.4 a	5.9 abc
70	70	70	465 b			42 b			7.6 a		
80	80	80		427 b	385 c		22 a	15 b		6.3 a	5.7 c
25	70	25	481 a			47 a					
50	35	35		441 a	408 a		25 a	17 ab	7.7 a	6.5 a	6.0 ab
35	70	70									
50	80	80		427 b	408 a		22 a	20 a		6.4 a	5.8 bc
80	50	50		434 ab	394 bc		24 a	16 b		6.4 a	5.8 bc

[1] Growth period during midseason (mid-July through mid-August) characterized by a decline in blossom production, boll set, and terminal growth.

[2] For explanation of (E_1), seep. 7.

[3] Number after the year refers to experiment number.

[4] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 58.—*Fiber elongation for 2 varieties of cotton, as affected by rate of nitrogen application and moisture level, Thorsby, Ala., 1956–59*

[Coker 100–A in 1956 and 1957; Deltapine 15 in 1958 and 1959]

Moisture level and rate of N application, pounds per acre [1]	(E_0), 1956 [2]	(E_1) [2] [3]			
		1956	1957	1958	1959
M_1:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
0	0.7 b	8.2 a	8.9	10.3 a	8.4 a
60	.8 ab	8.1 a	8.8		
120	.8 ab	8.1 a	8.7	11.6 c	9.4 b
240	.9 a	8.0 a	9.0	10.5 ab	8.7 ab
360				11.7 c	9.1 ab
Average	.8 x	8.1 x	8.9 x	11.0 xy	8.9 x
M_2:					
0	1.0 ab	9.5 a	8.6	10.8 a	9.6 a
60	.9 b	9.2 ab	9.4		
120	1.0 ab	9.1 ab	9.2	12.1 c	9.1 a
240	1.1 a	9.0 b	9.0	10.9 ab	9.7 a
360				11.2 b	9.5 a
Average	1.0 y	9.2 y	9.1 xy	11.3 y	9.5 y
M_3:					
0	1.1 ab	9.3 ab	10.1	9.1 a	9.1 a
60	1.2 a	9.6 a	9.7		
120	1.2 a	9.2 ab	10.0	12.1 c	8.5 a
240	1.0 b	9.1 b	9.2	9.9 b	9.4 a
360				11.5 c	9.4 a
480					9.2 a
720					9.3 a
Average	1.1 y	9.3 y	9.8 y	10.7 x	9.2 xy

[1] M_1, no irrigation; M_2 and M_3, irrigated when 65 and 35 percent, respectively, of the available soil moisture was depleted from the surface 24 inches of soil.

[2] For explanation of (E_0) and (E_1), see p. 7.

[3] Values for rate of N for each moisture level, by years, followed by the same letter or letters or the averages for all N rates at each moisture level, by years, followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 59.—*Fiber elongation (E_1) for 8 varieties of irrigated cotton, as affected by variety and topping of plants, Thorsby, Ala., 1960–61*

Variety [1]	Fiber elongation (E_1) for year and treatment indicated [2 3 4]					
	1960		1961		2-year average	
	T	U	T	U	T	U
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Stardel	8.4 a	9.0 a	7.1 a	7.2 a	7.8 e	8.1 a
Stoneville 7	9.5 bc	9.4 ab	8.4 cd	8.2 e	9.0 b	8.8 bc
Empire	9.2 b	9.7 b	7.1 a	7.6 b	8.2 d	8.7 b
Coker 124 B	9.7 bc	9.7 b	8.3 c	8.3 c	9.0 b	9.0 bc
Auburn 56	10.8 d	10.9 d	8.8 e	9.6 e	9.8 a	10.3 e
La DC–10	10.1 c	10.4 cd	8.9 e	8.8 d	9.5 a	9.6 d
Arizona Acala 44	9.7 c	10.0 bc	7.5 b	7.6 b	8.6 c	8.8 bc
Delta Queen	9.3 bc	9.9 bc	8.5 cd	8.4 c	8.9 bc	9.2 cd
Average all varieties	9.6 x	9.9 y	8.1 x	8.2 x	8.9 x	9.1 x

[1] All varieties fertilized with 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually.

[2] For explanation of (E_1), see p. 7.

[3] T, plants topped at 48 inches when 51 inches high; U, plants not topped.

[4] Values in the same column followed by the same letter or letters or the averages of topped and not topped, by years, followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 60.—*Fiber elongation (E_1) for Auburn 56 cotton, as affected by topping and side-branch pruning, Thorsby, Ala., 1960–61*

(Plant population—2 or 3 per foot)

Treatment [1]	Fiber elongation (E_1) [2 3]	
	1960	1961
	Percent	*Percent*
Check	9.8 bc	9.2 b
Side branches pruned	9.5 a	9.5 bc
Topped at 36 inches when 39 inches high	10.2 cd	8.8 a
Topped at 42 inches when 45 inches high	9.5 a	9.6 c
Topped at 48 inches when 51 inches high	9.5 a	8.8 a
Topped at 42 inches, side branches pruned	9.7 ab	9.5 bc
Topped at 48 inches, side branches pruned	9.7 ab	8.7 a
Topped at 42 inches when 52 inches high	10.0 d	9.7 c

[1] All plots received 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually. Irrigated when 50 percent of the available water was depleted from the top 24 inches of soil.

[2] For explanation of (E_1), see p. 7.

[3] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 61.—*Fiber elongation (E_1) for 9 varieties of irrigated cotton, Thorsby, Ala., 1958–59*

Variety [1]	Fiber elongation (E_1) [2 3]		
	1958	1959	2-year average
	Percent	*Percent*	*Percent*
Deltapine 15	11.6 e	9.2 d	10.4 c
Stoneville 7	10.5 d	8.7 c	9.6 b
Empire	9.5 a	8.6 c	9.0 a
Coker 100–A	10.3 cd	8.1 b	9.2 ab
Rex	10.2 cd		
Acala 4–42	10.1 bcd	7.7 a	8.9 a
Acala 44	9.6 ab	8.7 c	9.2 ab
Plains	9.8 abc	8.2 b	9.0 a
Auburn 56		9.5 e	
Average all varieties	10.2	8.6	

[1] All varieties fertilized with 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually. Irrigation applied uniformly to all varieties when 50 percent of available soil moisture was depleted from top 24 inches of soil.

[2] For explanation of (E_1), see p. 2.

[3] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 62.—*Micronaire for 2 varieties of cotton, as affected by rate of nitrogen application and irrigation level, Thorsby, Ala., 1957–59*

[Coker 100–A in 1957; Deltapine 15 in 1958 and 1959]

Moisture level and rate of N application, pounds per acre [1]	Micronaire [2]		
	1957	1958	1959
M_1:	*μg./inch*	*μg./inch*	*μg./inch*
0	3.8 b	3.48 a	3.57 b
60	4.2 a		
120	3.9 b	3.33 ab	3.50 b
240	3.7 b	3.18 b	3.78 a
360		3.20 ab	3.81 a
Average	3.9 y	3.30 x	3.67 y
M_2:			
0	4.2 a	3.45 a	3.78 a
60	4.3 a		
120	4.3 a	3.30 a	3.61 a
240	4.1 a	3.35 a	3.73 a
360		3.46 a	3.70 a
Average	4.2 x	3.39 x	3.71 xy
M_3:			
0	4.2 a	3.72 a	3.83 a
60	4.3 a		
120	4.2 a	3.44 ab	3.87 a
240	4.2 a	3.18 b	3.76 ab
360		3.26 b	3.76 ab
480			3.70 ab
720			3.60 b
Average	4.2 x	3.40 x	3.75 x

[1] M_1, no irrigation; M_2 and M_3, irrigated when 65 and 35 percent, respectively, of the available soil moisture was depleted from the surface 24 inches of soil.

[2] Values for rate of N for each moisture level, by years, followed by the same letter or letters or the averages for all N rates at each moisture level, by years, followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 63.—*Micronaire for Stoneville 7 cotton, as affected by rate of potassium application and harvest date, Thorsby, Ala., 1960*

Rate of K applied, pounds per acre [1]	Micronaire when cotton was picked on [2]—				Average
	Sept. 8	Sept. 20	Oct. 13	Oct. 26	
	μg./inch	*μg./inch*	*μg./inch*	*μg./inch*	*μg./inch*
0	4.23 cd	3.93 bc	3.20 c	3.10 d	3.70 c
62.5	5.28 a	4.55 a	4.70 a	4.65 a	4.80 a
125	4.70 b	4.18 b	4.30 b	3.92 c	4.28 b
250	3.93 d	4.05 bc	4.73 a	4.20 b	4.23 b
375	4.05 d	3.98 bc	4.35 b	4.85 a	4.31 b
500	4.43 bc	3.78 c	4.65 a	4.40 b	4.32 b

[1] All plots received 360 lb. of N and 132 lb. of P per acre, annually.
[2] Values in the same column or for same rate of K at the 4 harvest dates followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 64.—*Micronaire for 2 varieties of irrigated cotton, as affected by rate of nitrogen and potassium application, Thorsby, Ala., 1961–62*

[Stoneville 7 in 1961; Auburn 56 in 1962]

Rate of application [1]		Micronaire [2]	
N	K	1961	1962
Lb./acre	*Lb./acre*	*μg./inch*	*μg./inch*
120	125	4.01 ab	3.66 bcd
120	250	4.04 ab	3.60 cd
120	500	3.88 bc	3.79 abc
240	125	3.89 bc	3.60 cd
240	250	3.95 ab	3.80 abc
240	500	3.65 bc	3.54 d
360	125	4.00 ab	3.73 bcd
360	250	3.93 ab	3.86 ab
360	500	3.81 bc	3.70 bcd
0	0	3.96 ab	3.52 d
0	500	4.24 a	4.00 a
360	0	3.51 c	2.79 e

[1] All plots received 132 lb. of P per acre, annually. Irrigation was applied when 50 percent of the available soil moisture was depleted from the top 24 inches of soil.
[2] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 65.—*Micronaire for 8 varieties of irrigated cotton, as affected by variety and topping, Thorsby, Ala., 1960–61*

Variety [1]	Micronaire for year and treatment indicated [2 3]					
	1960		1961		2-year average	
	T	U	T	U	T	U
	μg./inch	*μg./inch*	*μg./inch*	*μg./inch*	*μg./inch*	*μg./inch*
Stardel	3.81 abc	3.72 ab	3.27 ab	3.38 ab	3.54 abc	3.55 ab
Stoneville 7	3.88 ab	3.79 a	3.38 a	3.49 a	3.63 ab	3.64 a
Empire	3.34 ef	3.21 e	3.24 ab	3.11 cd	3.29 cd	3.16 cd
Coker 124 B	4.05 a	3.50 bcd	3.40 a	3.45 a	3.73 a	3.48 ab
Auburn 56	3.25 f	3.23 de	3.17 b	2.97 d	3.21 d	3.10 d
La DC–10	3.62 bcd	3.58 abc	3.28 ab	3.20 bc	3.45 bcd	3.39 abc
Arizona Acala 44	3.54 cde	3.46 cde	3.42 a	3.11 cd	3.48 abc	3.29 bcd
Delta Queen	3.80 abc	3.49 bcd	3.32 ab	3.40 ab	3.56 ab	3.45 ab
Average all varieties	3.66 x	3.50 y	3.31 x	3.26 x	3.49 x	3.38 xy

[1] All varieties fertilized with 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually.
[2] T, plants topped at 48 inches when 51 inches high; U, plants not topped.
[3] Values in the same column followed by the same letter or letters or the averages of topped and not topped, by years, followed by the same letter are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 66.—*Micronaire for Auburn 56 cotton, as affected by topping and pruning of side branches, Thorsby, Ala., 1960–61*

[Plant population—2 or 3 per foot]

Treatment [1]	Micronaire [2]			
	1960		1961	
	1st harvest	Average	1st harvest	Average
	μg./inch	*μg./inch*	*μg./inch*	*μg./inch*
Check	3.50 c	3.95 bc	2.98 d	3.20 e
Side branches pruned	3.83 b	4.14 a	3.43 c	3.53 abc
Topped at 36 inches when 39 inches high	3.40 c	3.85 cd	3.13 d	3.26 de
Topped at 42 inches when 45 inches high	3.73 b	3.82 cd	3.93 a	3.59 ab
Topped at 48 inches when 51 inches high	4.13 a	4.05 ab	3.43 c	3.36 cde
Topped at 42 inches, side branches pruned	3.40 c	3.77 d	3.60 b	3.40 bcd
Topped at 48 inches, side branches pruned	3.83 b	3.86 cd	3.75 b	3.64 a
Topped at 42 inches when 52 inches high	3.53 c	3.81 d	3.38 c	3.29 de

[1] All plots received 300 lb. of N, 92 lb. of P, and 175 lb. of K per acre, annually. Irrigated when 50 percent of the available water was depleted from the top 24 inches of soil.

[2] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

TABLE 67.—*Micronaire for Pima S-1 cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1958–60*

Date of flowering, week No.	Micronaire for year and moisture regime indicated [1] [2]						
	1958		1959		1960		
	M	D	W	M	W	M	D
	μg./inch	*μg./inch*	*μg./inch*	*μg./inch*	*μg./inch*	*μg./inch*	*μg./inch*
1	2.10	2.53	2.52	2.46	2.99	2.73	2.70
2	2.50	2.87	2.59	2.88	2.66	2.60	2.90
3	2.55	2.86	2.94	3.31	3.30	3.14	3.37
4	2.82	3.09	2.97	3.26	3.12	3.42	3.36
5	3.01	3.08	2.78	3.00	2.98	3.44	3.56
6	3.24	3.31	3.44	3.52	3.35	3.22	3.13
7	3.48	3.60	3.70	3.67	3.48	3.55	3.34
8	3.54	3.47	3.82	3.93	2.76	3.03	3.68
9	3.62	3.44	3.76	3.69	3.35	3.43	3.45
10	3.55	3.32	3.42	3.30	3.25	3.42	3.28
11	3.57	3.44	3.00	3.10	3.09	3.19	2.87
12	3.16	2.76	2.12	2.31	2.32	2.63	2.34
Mean	3.10	3.15	3.09	3.20	3.05	3.14	3.16
Water	NS		*		NS		
Weeks	**		**		**		
Water × weeks	**		NS		NS		
Duncan's multiple range test (5-percent), weeks	0.184–0.206		0.22–0.25		0.25–0.29		

[1] Moisture regimes: W, wet; M, medium; and D, dry.
[2] NS, no significant difference; *, 5-percent level of significance; **, 1-percent level of significance.

TABLE 68.—*Micronaire for Deltapine Smooth Leaf cotton, as affected by soil moisture regime and flowering date, Tempe, Ariz., 1960–61*

Date of flowering, week No.	Micronaire for year and moisture regime indicated [1] [2]				
	1961			1962	
	W	M	D	W	M
	μg./inch	*μg./inch*	*μg./inch*	*μg./inch*	*μg./inch*
1	4.85	4.43	5.23	5.10	4.93
2	5.17	5.07	5.72	4.40	4.80
3	5.43	5.75	5.48	4.47	3.85
4	5.30	5.45	4.98	4.57	4.63
5	5.10	5.48	5.27	4.37	4.47
6	5.12	5.32	5.54	4.58	5.30
7	5.06	5.31	5.80	5.02	5.38
8	5.00	5.30	5.85	4.55	4.65
9	4.62	5.20	5.30	4.35	4.65
10	4.85	4.90	4.75	4.20	4.62
11	4.15	3.87	3.75	4.05	3.77
12	2.65	2.67	2.42	3.65	3.37
Mean	4.78	4.90	5.01	4.44	4.53
Water		NS		NS	
Weeks		**		**	
Water×weeks		*		NS	
Duncan's multiple range test (5-percent), weeks		0.35–0.40		0.65–0.70	

[1] Moisture regimes: W, wet; M, medium; and D, dry.
[2] NS, no significant difference; *, 5-percent level of significance; **, 1-percent level of significance.

TABLE 69.—*Micronaire for 2 varieties of irrigated cotton, as affected by soil moisture regime and variety, Brawley, Calif., 1958–59*

Available soil moisture used at time of irrigations (0–24 inch depth)			Micronaire for variety and year indicated [2] [3]			
1st bloom	Cut-out [1]	2d bloom	Acala 4–42		R–15	
			1958–1	1959–2	1958–1	1959–2
			μg./inch	*μg./inch*	*μg./inch*	*μg./inch*
35	35	35	4.9 ab	4.6 a	5.3 c	4.6 a
50	50	50	4.9 ab	4.5 a	5.4 bc	4.4 a
80	80	80	5.0 ab	4.5 a	5.7 a	4.4 a
50	35	35	4.9 ab	4.6 a	5.3 c	4.6 a
50	80	80	5.1 a	4.6 a	5.6 ab	4.5 a
80	50	50	4.8 b	4.3 a	5.6 ab	4.5 a

[1] Growth period during midseason (mid-July through mid-August) characterized by a decline in blossom production, boll set, and terminal growth.

[2] Number after the year refers to the experiment number.

[3] Values in the same column followed by the same letter or letters are not significantly different at the 5-percent level according to Duncan's multiple range test.

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