The Effect Of Skip-Row Plantings On Agronomic And Fiber Properties Of Cotton In Oklahoma

Jerry L. Baker,
Laval M. Verhalen, and
Jay C. Murray

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Introduction

Skip-row planting is the practice of alternating planted rows of a crop with blank or skipped rows. In recent years, federal acreage allotments and price supports in cotton have made necessary the consideration of skip-row patterns as a possible method of maximizing yield of fiber and net returns per allotted acre.

Skip-row plantings of cotton have always been permitted by the Agricultural Stabilization and Conservation Service (ASCS), the branch of the federal government which enforces acreage allotments; but most producers did not use this method of planting prior to 1956 because the ASCS considered both planted and skipped rows as planted to cotton. From 1956 to the present, certain skip-row patterns have been encouraged depending upon the regulations in force at a particular time for determining the cotton acreage. From 1956 through 1961, regulations required skipped areas less than 12 feet wide to be counted as solidly planted cotton.

In 1962 the regulations were changed to require a skipped area at least 63 inches from plant row to plant row, and this allowed almost any combination of skip-row planting patterns to be used. In an effort to curtail total cotton production because of large surpluses on hand at the time, restrictions were again imposed on skip-row plantings in 1966 and 1967. Under those regulations, an area of two rows planted and one skipped (2 x 1) and two rows planted and two skipped (2 x 2) counted as 86⅔ percent and 65 percent planted, respectively, compared with 66⅔ percent and 50 percent, respectively, under the 1962-65 regulations. In 1968 regulations reverted to the 1962-65 plan in which only the area actually planted to cotton would be counted as cotton acreage. These regulations have been maintained through the 1970 growing season.

The practice of skip-row planting of cotton in the United States increased from a few hundred acres in 1956 to nearly three million acres in 1965. Skip-row plantings were increasing in all areas of the Cotton Belt until restrictions were imposed on the 2 x 1 and 2 x 2 skip-row patterns in 1966 and 1967. In 1967 the acreage planted to skip-row

patterns had dropped to approximately 1 ½ million acres. From 1962 through 1965 patterns involving less than four planted rows were most widely used. However, the restrictions imposed in 1966 and 1967 encouraged most growers to switch to patterns involving four or more planted rows and to divert more acreage. ASCS data show that in Oklahoma the use of skip-row planting increased from approximately 12,000 acres in 1961 to 37,000 acres in 1965.[1] The skip-row acreage fell to near 20,000 acres in 1966 and to near 13,700 acres in 1967. Statistics on the acreage planted in 1968 and 1969 are unavailable at the present time.

The objectives of this research were to determine the effects of three skip-row planting patterns versus a solidly planted check on the agronomic and fiber properties of cotton grown under Oklahoma conditions and to compare the results obtained with those of similar studies elsewhere. In addition, measurements were taken to determine the influence of row position in the 4 x 4 pattern on agronomic characteristics and fiber properties.

Materials and Methods

Treatments

'Lankart 57', a medium-early stormproof variety, was planted in the following planting patterns: plant two rows-skip one (2 x 1), plant two-skip two (2 x 2), plant four-skip four (4 x 4), and plant all-skip none as a check. Lankart 57 was chosen because it was the most popular variety grown in Oklahoma under dryland conditions at the time. The 2 x 1, 2 x 2, and 4 x 4 patterns were studied since they are the most commonly employed skip-row systems across the Cotton Belt.

Cultural Methods

In 1965 and 1966 dryland tests were conducted on a Reinach silt loam and a Meno loamy sand at Chickasha and Mangum, Oklahoma, respectively. A randomized complete block experimental design with four replications was used at each location each year. Plots included four planted rows of cotton 100 feet long. Initially the entire area of the test was planted in 40-inch rows with acid-delinted and chemically treated seed at a rate of approximately 20 pounds per acre. The skip-row patterns were established between two and three weeks after germination in each test by eliminating all plants in the appropriate rows. Two border rows were left between adjacent plots in an attempt to

[1]Agricultural Stabilization and Conservation Service, Oklahoma State Office, Stillwater, Oklahoma. Personal Communication. April 4, 1969.

equalize border effects between plots. The planting dates in 1965 at Chickasha and Mangum were June 3 and June 9, respectively, and June 6 at Chickasha and June 16 at Mangum in 1966. Fertilizer was not applied to the experiment in either year at Chickasha since that soil is inherently fertile. The plots at Mangum were fertilized, before planting, with 150 and 200 pounds of 14-28-14 fertilizer per acre in 1965 and 1966, respectively. Cultural practices were performed as required to control weeds and insects.

Data Collection

Most data were taken on a plot basis for both agronomic and fiber characters. Subsamples within plots were taken for plant height and between the two inside and outside rows of the 4 x 4 pattern for all traits. Plant height was measured in inches just prior to the first killing frost in each year at Chickasha. Before harvesting, 25-boll samples were taken from all plots within a test, and these samples were used to determine boll size and seed index. Boll size was measured as the weight in grams of seedcotton per boll, and seed index was calculated as the weight in grams of 100 seed. Two harvests could be made only on the 1965 Chickasha test. Earliness in that test was expressed as percent first harvest and based on lint rather than seedcotton yield. It was calculated by dividing the weight of lint in pounds obtained from the first harvest of a plot by the total lint yield of that plot. Each plot was harvested by hand, snapped cotton weighed separately, and weights recorded to the nearest hundredth of a pound.

Four to 4 ½ pound samples of snapped cotton were obtained from each plot and ginned on a 10-saw gin to determine pulled lint percent, i.e., the percentage of lint in a snapped sample of cotton. These percentages were then multiplied by the weights of snapped cotton per plot to obtain lint yields. These plot yields were next multiplied by correction factors to convert them to an acre basis. Yields are reported in pounds of lint per acre on an allotted acre basis under the four sets of ASCS regulations described previously.

The lint portions from the ginned samples discussed above were taken to the fiber laboratory for measurements of fiber length, strength, and coarseness. Fiber length was measured in inches on the digital fibrograph as 2.5 percent span length. Fiber strength was measured on the stelometer at the ⅛-inch and 0-inch gauge settings in grams per grex. Fiber coarseness was measured on the micronaire in micronaire units. Fiber samples from each harvest from each plot of the 1965 Chickasha test were analyzed separately, and then a weighted average of each fiber measurement over the two harvests was calculated for each

plot based on percentage of total lint yield per harvest of that plot. All subsequent calculations using the 1965 data from Chickasha were made from those weighted averages.

Analysis of Data

Due to late planting caused by unfavorable weather conditions, an extremely early frost, and a severe fusarium wilt infestation during the growing season, the Mangum test was not harvested in 1966. This reduced the study to three tests (Chickasha in 1965 and 1966 and Mangum in 1965).

The three tests were treated as separate environments in the analysis of the data. The procedure was to conduct a three-environment, combined analysis of variance on a plot basis for each character measured. The F-test was made for environment, treatment, and environment by treatment interaction effects. If a nonsignificant interaction effect was obtained, no further analyses were necessary; and inferences were based on the three-environment average for that particular character. If a significant interaction was found in the initial analyses of a character, separate analyses of variance were conducted for that character in each test. The Duncan's New Multiple Range Test was used to show the significant differences or lack of them among treatment means for each character.

Results and Discussion

Investigation Among Planting Patterns

In the past when skip-row patterns have been compared to the solid pattern, lint yields have been reported on an actual planted area basis and/or on a total area basis. The planted area basis reflects yield from only those rows occupied by cotton while the total area basis reflects yield from both the planted and adjacent rows. Most researchers have reported yields on a planted area basis because it is more useful in showing the added yield increase per allotted acre of skip-row systems over solid systems. However, some have preferred to report yields on a total area basis since it reflects productivity of both planted and fallow areas used in the planting pattern. In this report, yields were analyzed under each of the various ASCS regulations that have been in effect at different times.

Presented in Table 1 is a summary of those regulations up to and including the present. Under those calculations of yield based on the regulations in effect prior to 1956, the allotted area is equal to yield on a total area basis. This means that both planted and fallow rows are

Table 1. ASCS Skip-Row Regulations

Row Pattern	Percent of Total Acreage in Cotton	Percent of Total Acreage as Allotted Acreage			
		Prior to 1956	1956-61	1962-65, 1968-70	1966-67
Solid	100	100	100	100	100
2 X 1	66⅔	100	100	66⅔	86⅔
2 X 2	50	100	100	50	65
4 X 4	50	100	50	50	50

included in the calculation of yield per unit area. Under the regulations where acreages are determined only on planted rows in the allotment, the allotted acre yields are equal to yields calculated on a planted area basis. The allotted acre yields for the 2 x 1 and 2 x 2 patterns under the 1966-67 regulations were calculated by including the respective penalties imposed.

Agronomic Characters The results of this study on the effects of skip-row planting on the agronomic characters examined are summarized in this section. Those characters are yield under each of four sets of regulations, pulled lint percent, boll size, earliness, plant height, and 100 seed index. The subsequent section will discuss the results of skip-row planting on the fiber characters of cotton.

Lint Yield. Lint yield per allotted acre under the four sets of regulations is summarized for each environment in Tables 2 and 3. Yield response to planting pattern was similar under each set of regulations in the 1965 Chickasha and Mangum environments. Under the regulations effective prior to 1956, the solid, 2 x 1, and 2 x 2 patterns produced significantly higher yields in 1965 than the 4 x 4 pattern. In the 1966 Chickasha test the solid planting produced significantly higher yields than any of the skip-row patterns. Based on this method of calculating an allotment, the four planted rows of cotton in the 4 x 4 pattern apparently cannot compensate for the yield lost by skipping the four adjacent rows. Under this set of regulations, one probably should plant cotton in the solid pattern. Research studies in Texas have given similar results. Newman (9) summarized long-term studies of skip-row cropping systems on the High Plains and Rolling Plains of Texas and found no significant differences between yields of solid and skip-row cotton when calculated on a total acre basis. Rich (11) in studies conducted from 1962 through 1966 in the Grand Prairie area of Texas concluded that if the objective is yield per total acre then solid planting and the 2 x 1 pattern would give similar responses and should be used.

Table 2. Comparative Yield Among Planting Patterns (ASCS Regulations up to 1962): Analyses of Separate Environments

Row Pattern	Pounds Lint Per Allotted Acre					
	ASCS Regulations: Prior to 1956			ASCS Regulations: 1956-61		
	Mangum	Chickasha		Mangum	Chickasha	
	1965	1965	1966	1965	1965	1966
Solid	223 a*	478 a*	283 a*	223 b*	478 b*	283 a*
2 X 1	247 a	517 a	202 b	247 b	517 b	202 b
2 X 2	223 a	486 a	150 c	223 b	486 b	150 b
4 X 4	176 b	396 b	140 c	353 a	793 a	279 a

*Values within a column followed by a common letter are not significantly different at the 0.05 level of probability.

Table 3. Comparative Yield Among Planting Patterns (ASCS Regulations 1962 to 1970): Analyses of Separate Environments

Row Pattern	Pounds Lint Per Allotted Acre					
	ASCS Regulations: 1962-65, 68-70			ASCS Regulations: 1966-67		
	Mangum	Chickasha		Mangum	Chickasha	
	1965	1965	1966	1965	1965	1966
Solid	223 c*	478 c*	283 a*	223 c*	478 c*	283 a*
2 X 1	371 b	778 b	304 a	286 b	599 b	233 a
2 X 2	445 a	972 a	300 a	343 a	748 a	230 a
4 X 4	353 b	793 b	279 a	353 a	793 a	279 a

*Values within a column followed by a common letter are not significantly different at the 0.05 level of probability.

Under the 1956-61 regulations, only the planted rows in the 4 x 4 pattern were counted in the grower's allotment. Using this method of calculating alloted acres, the 4 x 4 pattern produced significantly higher yields than the other patterns in 1965. At Chickasha in 1966, no significant differences were found between the solid and 4 x 4 pattern while both produced significantly higher yields than the 2 x 1 and 2 x 2 patterns. Under these regulations, one should probably plant his cotton in the 4 x 4 pattern provided he has the acreage available to do so. If not, he should plant what he can in the 4 x 4 pattern with the remainder being planted in the solid pattern.

Under the 1962-65, 68-70 regulations, only the planted rows in each skip-row pattern were included as part of the allotment; and yields correspond to those calculated on a planted area basis. All patterns had significantly higher yields than the solid planting in the 1965 tests and the 2 x 2 pattern produced significantly higher yields than the 2 x 1 and 4 x 4 patterns. However, there were no differences for yield among

planting patterns in 1966. Under these regulations, one would be advised to plant skip-row patterns rather than solid cotton. However, primary advantage would appear to lie with the 2 x 2 pattern.

Researchers in Alabama (12) and Mississippi (2, 5) showed substantial increases for the 2 x 2 and 4 x 4 patterns over solid planting with the 2 x 2 pattern giving the greatest increases. Varietal studies in Georgia (7) and Tennessee (4) have shown substantial increases in yield with the 2 x 2 skip-row system over solid planting. Other studies in Georgia (7), Mississippi (1, 3), and Texas (10) compared both the 2 x 1 and 2 x 2 systems with solid plantings and obtained substantial increases in yield with the skip-row systems. In all of these studies the 2 x 2 pattern produced greater increases in yield than the 2 x 1 pattern.

The 1966-67 regulations were intermediate between those prior to 1961 and those of 1962-65, 68-70 in that a portion of the skipped rows in the 2 x 1 and 2 x 2 patterns were counted as planted cotton. The restrictions, as expected, did have a deflating effect on the calculated yields per acre obtained from those two skip-row patterns. However, even then, all skip-row patterns produced significantly higher yields than the solid plantings in the 1965 tests; and the 2 x 2 and 4 x 4 patterns had significantly higher yields than the 2 x 1 pattern. The 1966 data show no significant differences among planting patterns. Under these regulations, one should still plant in a skip-row pattern rather than in the solid pattern. Preference should be given to the 2 x 2 and 4 x 4 patterns over the 2 x 1.

Pulled Lint Percent. Table 4 contains the pulled lint percent data for each pattern in each environment. The importance of this trait lies in the fact that the higher the pulled lint percent the fewer pounds of snapped cotton are required to make a bale. Harvesting and ginning costs are therefore lower. A significant decrease in lint percent was obtained in going from solid to skip-row planting in 1965 at Mangum. However, no significant differences were found for lint percent at

Table 4. Comparative Pulled Lint Percent and Boll Size Among Planting Patterns: Analyses of Separate Environments

Row Pattern	Pulled Lint Percent			Boll Size		
	Mangum	Chickasha		Mangum	Chickasha	
	1965	1965	1966	1965	1965	1966
Solid	26.5 a*	27.8 a*	22.5 a*	7.28 a*	8.20 c*	7.73 a*
2 X 1	25.4 b	27.9 a	22.3 a	7.45 a	8.71 b	7.94 a
2 X 2	25.2 b	27.9 a	22.3 a	8.24 a	9.03 a	7.38 a
4 X 4	24.0 c	27.9 a	22.1 a	7.31 a	9.06 a	7.41 a

*Values within a column followed by a common letter are not significantly different at the 0.05 level of probability.

Chickasha in either year. These results tend to agree with the research of others (8, 13) in that planting patterns have no consistent effect on pulled lint percent.

Boll Size. The boll size data are also shown in Table 4. All skip-row patterns produced significantly larger bolls than the solid planting in the 1965 Chickasha environment while the 4 x 4 and 2 x 2 patterns had significantly larger bolls than the 2 x 1 pattern. No significant differences were found in the other two tests. Larger bolls mean that fewer bolls are required to produce a pound of seedcotton. Other research (1, 7, 8) has shown that an increase in boll size can be expected when going from solid to skip-row planting systems.

Earliness. Two harvests could be made at Chickasha in 1965; and as a result, earliness measured as percent first harvest could be studied in that one environment. As shown in Table 5, there was a tendency toward earliness in solid planting even though no significant differences were found among patterns. Several years of research in Mississippi (1, 3) and the Coastal Plains of Georgia (6) revealed a slight tendency toward earlier maturity in solid plantings compared to skip-row systems.

Plant Height. An examination of plant height in the 1965 Chickasha test (Table 5) shows that plants grown in the 2 x 2 and the two outside rows of the 4 x 4 pattern were significantly taller than plants in the 2 x 1, in the solid planting, and in the two inside rows of the 4 x 4 pattern. There was no significant difference between the two inside rows of the 4 x 4 pattern and the 2 x 1 pattern. However, the plants grown in the 2 x 1 pattern were significantly taller than plants grown in the solid planting. In the 1966 Chickasha test there was a tendency for plants grown in the 2 x 1, 2 x 2, and the two outside rows

Table 5. Comparative Earliness, Plant Height, and 100 Seed Index Among Planting Patterns: Analyses of Separate or Combined Environments

Row Pattern	Percent First Harvest, Chickasha 1965	Plant Height, Chickasha 1965	Plant Height, Chickasha 1966	100 Seed Index, Combined Environments
Solid	83.0 a*	20.2 c*	33.1 a*	14.5 a*
2 X 1	78.7 a	25.0 b	36.7 a	14.6 a
2 X 2	71.5 a	29.5 a	36.7 a	15.0 a
4 X 4	72.1 a			14.7 a
4 X 4 (outside rows)		28.8 a	36.9 a	
4 X 4 (inside rows)		22.0 bc	33.9 a	

*Values within a column followed by a common letter are not significantly different at the 0.05 level of probability.

of the 4 x 4 pattern to be taller than plants grown in the solid planting and the two inside rows of the 4 x 4; however, the difference was not large enough to be significant. These data suggest that the 2 x 1, 2 x 2, and the two outside rows of the 4 x 4 pattern obtain more moisture from adjacent fallow areas than do the inside rows of the 4 x 4 pattern. Of course, with solid planting there are no adjacent fallow areas. Plant height responses may vary from year to year because of amount and distribution of rainfall.

100 Seed Index. The means for 100 seed index over three environments may also be found in Table 5. No significant differences in this character due to planting pattern were obtained.

Fiber Characters Skip-row planting systems may provide an environment more conducive to the development of cotton fiber than do solid plantings. Considering the emphasis placed on fiber quality in recent years, this possible increase was of interest and was investigated.

Fiber Length. Fiber length is important in that it has a direct bearing on the price per pound that the grower receives for his lint. The fiber lengths presented in Table 6 revealed significant differences in the effects of the patterns in the 1965 tests, but not in the 1966 test. Apparently, an increase in fiber length is more likely to be obtained in the 2 x 2 pattern. Earlier studies in Mississippi (1, 3) and Georgia (7) found planting pattern to have a significant influence on fiber length. However, other investigators (4, 10) obtained no significant differences among planting patterns for fiber length.

Fiber Strength. The means for the two fiber strength measurements over the three environments may be found in Table 7. No significant differences in fiber strength due to planting patterns were found. Other researchers (1, 7, 10) have revealed similar findings.

Fiber Coarseness. The means for fiber coarseness may also be found in Table 7. No significant differences between planting patterns were

Table 6. Comparative Fiber Length Among Planting Patterns: Analyses of Separate Environments

Row Pattern	Fiber Length		
	Mangum	Chickasha	
	1965	1965	1966
Solid	.980 b*	1.016 b*	1.038 a*
2 x 1	1.007 ab	1.040 a	1.033 a
2 X 2	1.037 a	1.060 a	1.035 a
4 x 4	.995 b	1.059 a	1.036 a

*Values within a column followed by a common letter are not significantly different at the 0.05 level of probability.

Table 7. Comparative Fiber Strength and Coarseness Among Planting Patterns: Analyses of Separate or Combined Environments

Row Pattern	Fiber Strength Combined Environments 1/8-inch Gauge Stel.	0-inch Gauge Stel.	Fiber Coarseness Mangum 1965	Chickasha 1965	Chickasha 1966
Solid	1.92 a*	3.31 a*	4.5 a*	4.5 a*	3.0 a*
2 X 1	1.95 a	3.27 a	4.6 a	4.5 a	3.0 a
2 X 2	1.92 a	3.27 a	4.6 a	4.6 a	2.8 a
4 X 4	1.93 a	3.30 a	4.5 a	4.7 a	2.8 a

*Values within a column followed by a common letter are not significantly different at the 0.05 level of probability.

shown for fiber coarseness in any of the tests. Studies elsewhere have revealed rather inconsistent responses for fiber coarseness. Dick and Loe (3) in Mississippi obtained higher fiber coarseness readings in solid plantings than in 2 x 1 and 2 x 2 patterns. In contrast, Hawkins and Peacock (7) reported significantly lower fiber coarseness values in solid plantings in the Georgia Piedmont. Other studies (1, 6, 7) in Mississippi and Georgia revealed no consistent influence of planting pattern on fiber coarseness.

Investigation Within the 4 X 4 Pattern

An outside row in the 4 x 4 skip-row pattern competes for moisture and nutrients with an adjacent row of cotton on only one side while an inside row must compete with rows on each side. Measurements were taken to compare the effects of inside versus outside rows on the agronomic and fiber properties of cotton. Yield comparisons were made on a planted area basis.

Comparative yields, pulled lint percents, and boll sizes for each test are presented in Table 8. Outside rows produced significantly higher yields than inside rows in the 1965 tests, but not in the 1966 test. Outside rows produced significantly lower pulled lint percent at Mangum in 1965 while the differences at Chickasha were not significant. Bolls were significantly larger on the outside rows in the 1965 test at Chickasha, but not in the other two.

Comparative earliness, 100 seed index, and fiber length data are summarized in Table 9. No significant differences in earliness were detected between inside and outside rows. Significant differences in seed size between the outside and inside rows were found only in the 1965 Mangum test. Here, outside rows produced larger seed than inside rows. Outside rows produced significantly longer fiber at Chickasha in 1965 but not in the other two tests.

The means for fiber strength and coarseness over the three tests are shown in Table 10. Outside rows produced fiber with significantly higher 1/8-inch gauge stelometer values than inside rows. Higher 0-inch gauge stelometer values in the outside rows were also obtained although the difference was not statistically significant. No significant differences between row positions in this pattern were shown by fiber coarseness.

Table 8. Comparative Yield, Pulled Lint Percent, and Boll Size: Analyses of Separate Environments (4 X 4 Pattern)

Row Position	Mangum 1965	Chickasha 1965	Chickasha 1966
		Yield	
Outside	450 a*	1012 a*	293 a*
Inside	243 b	576 b	264 a
		Pulled Lint Percent	
Outside	22.9 b*	27.8 a*	22.4 a*
Inside	25.1 a	28.1 a	22.0 a
		Boll Size	
Outside	8.00 a*	9.36 a*	7.42 a*
Inside	6.63 a	8.76 b	7.41 a

*Values within a column followed by a common letter are not significantly different at the 0.05 level of probability.

Table 9. Comparative Earliness, 100 Seed Index, and Fiber Length: Analyses of Separate Environments (4 x 4 Pattern)

Row Position	Percent First Harvest Chickasha 1965	Mangum 1965	Chickasha 1965	Chickasha 1966
			100 Seed Index	
Outside	68.4 a*	15.3 a*	16.0 a*	14.0 a*
Inside	78.9 a	12.9 b	15.9 a	13.9 a
			Fiber Length	
Outside		1.021 a*	1.070 a*	1.028 a*
Inside		.970 a	1.043 b	1.044 a

*Values within a column followed by a common letter are not significantly different at the 0.05 level of probability.

Table 10. Comparative Fiber Strength and Coarseness: Analyses of Combined Environments (4 x 4 Pattern)

Row Position	Fiber Strength 1/8-inch Gauge Stel.	Fiber Strength 0-inch Gauge Stel.	Fiber Coarseness Micronaire
Outside	1.98 a*	3.31 a*	3.9 a*
Inside	1.88 b	3.28 a	4.0 a

*Values within a column followed by a common letter are not significantly different at the 0.05 level of probability.

Summary and Conclusions

Lankart 57, a medium-early stormproof cotton variety, was planted in solid and skip-row patterns (2 x 1, 2 x 2, and 4 x 4) in replicated, randomized tests in 1965 and 1966 at Chickasha and Mangum, Oklahoma. Due to extenuating circumstances, the 1966 test at Mangum could not be harvested. Data on yield (under four sets of ASCS regulations), pulled lint percent, boll size, earliness, plant height, seed size, fiber length, fiber strength, and fiber coarseness were studied.

From the data presented skip-row plantings appeared to affect yield, lint percent, boll size, plant height, and fiber length under some environmental conditions but not others.

The set of ASCS regulations used to calculate acreage had a significant effect on the interpretation of yield results. Under the regulations in effect prior to 1956, the solid pattern would give the most dependable high yields; under the 1956-61 regulations, the 4 x 4 pattern should be used as much as feasible with the remainder planted in the solid pattern; under the 1962-65, 68-70 regulations, any skip-row pattern would permit higher yields than solid planted cotton, but primary advantage would appear to lie with the 2 x 2 pattern; and under the 1966-67 regulations, one should still plant in the skip-row patterns rather than in the solid pattern, but preference should be given to the 2 x 2 and 4 x 4 patterns over the 2 x 1.

Planting pattern did not have a consistent influence on pulled lint percent. In 1965 at Mangum solid planting produced cotton with significantly higher lint percents than did the skip-row systems. However, no differences were found in the Chickasha tests. Planting patterns also had no consistent influence on boll size. Significantly larger bolls were produced by the skip-row patterns in 1965 at Chickasha, but not in the other tests. Although not significant, a tendency toward more earliness was evident in the solid pattern.

Based on the Chickasha tests, plants grown in the 2 x 1 and 2 x 2 patterns and in the outside rows of the 4 x 4 pattern will be taller than those grown in the solid pattern and in the inside rows of the 4 x 4 pattern.

The pattern of planting had no significant influence on 100 seed index, on 1/8-inch and 0-inch gauge stelometer, or on fiber coarseness.

Planting patterns did not have a consistent influence on fiber length. In the 1965 Chickasha test fiber from the skip-row patterns was significantly longer than that from the solid planting. In the 1965 Mangum environment fiber from only the 2 x 2 pattern was significantly longer than that from the solid planting. However, no significant differences in this trait were obtained in the 1966 Chickasha test. Fiber length increases are most likely to occur in the 2 x 2 pattern.

Analysis of inside versus outside rows of the 4 x 4 pattern suggests that increases in yield, boll size, seed size, plant height, fiber length, and 1/8-inch gauge stelometer and that decreases in pulled lint percent can often, but not invariably, be found in outside rows as compared to inside rows. No differences due to row position in the pattern were found for earliness, 0-inch gauge stelometer, and fiber coarseness.

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