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# **One-variety Cotton In Oklahoma**

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# One-variety Cotton in Oklahoma

By JOHN D. CAMPBELL<sup>1</sup>

For 40 years cotton farmers have been advised to grow only one variety of cotton<sup>2</sup> and to organize one-variety communities<sup>3</sup>. During this time, several advantages have been reported<sup>4</sup> while the disadvantages have received only limited attention.

However, in spite of the effort devoted to the encouragement, promotion, organization and operation of one-variety communities, observations and surveys in Oklahoma and other states reveal that the number of one-variety<sup>5</sup> areas is rather limited. Thus arises the question: Why have so few cotton farmers followed the recommendation to grow only one variety?

Some of the explanations have held responsible the marketing system<sup>6</sup>, the individuality of farmers<sup>7</sup>, and inadequate supplies of pure planting seed<sup>8</sup>. However, none of these seems to be a complete answer, either alone or in combination. Therefore, in 1947 several Southern

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<sup>2</sup> Cook, O. F., "Crop Improvement on a Community Basis." *Yearbook of the Department of Agriculture*. pp. 397-398. 1911.

<sup>3</sup> A "one-variety cotton community" has been defined as "an association of growers who have voluntarily banded together to standardize their production on a single variety. The community is organized on the basis of a gin as a unit. It may be limited to one gin or expanded to include all the gins in a county or larger area."—"Study of Agricultural and Economic Problems of the Cotton Belt." *Hearings Before the Special Sub-committee on Cotton of the Committee on Agriculture, House of Representatives; Eightieth Congress, First Session, Part 2.* p. 958. Hereafter this publication will be referred to as *Hearings*.

<sup>4</sup> *Yearbook of Agriculture*. "Cotton." p. 138. 1933.

<sup>5</sup> In this report, "one variety" is used to mean the ginning of only one variety of cotton per gin, and does not refer to the extent of an organization, if any.

<sup>6</sup> *U.S.D.A. Farmers' Bul.* 1686. "Common Errors in Cotton Production." p. 2. Jan., 1932.

<sup>7</sup> Cook, O. F., "One-variety Cotton Communities." *U.S.D.A. Bul.* 1111. p. 5. Nov. 25, 1922.

<sup>8</sup> *Hearings*. p. 951.

agricultural experiment stations undertook a thorough study of the economic advantages and disadvantages of one-variety operations. This bulletin reports the Oklahoma phase of that study<sup>9</sup>.

The information presented herein comes from two sources:

1. Interviews with 128 cotton farmers in Oklahoma's cotton-growing areas, 30 gin managers, and seven cotton buyers having special knowledge of the subject, and
2. Analysis of grade and staple data from the Altus and Oklahoma City Classing Offices of the Production and Marketing Administration, Cotton Branch, United States Department of Agriculture<sup>10</sup>.

## ADVANTAGES

The number of advantages reported for growing only one variety of cotton has ranged from a few to more than 20<sup>11</sup>. Three advantages often reported and seemingly of major significance are:

1. Permits the maintenance of pure seed;
2. Provides "a large volume of a product of uniform quality for the manufacturer," and
3. Results in larger cash returns.

The 128 cotton farmers interviewed in Oklahoma reported eight advantages as listed in Table I.

## Pure Cottonseed

Gins are one of the most common locations where varieties of cottonseed become mixed. If all of the patrons of a gin produced the same variety, this source of varietal mixture would be removed. However, mixtures from other sources would still be possible. For example, cross pollination from neighboring fields where other varieties are grown and the cotton ginned at other gins might still present problems, as would the degree of purity of breeding.

There are two limitations on the production of pure cottonseed that have not always received due attention. First, a one-variety gin located in an area where several varieties are grown will likely suffer a substantial reduction in the volume of cotton ginned. Furthermore, the gin will find it difficult to purchase cotton and cottonseed unless

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<sup>9</sup> This report is based on work done in Oklahoma in cooperating on the Regional Cotton Marketing Project No. SM-1. Cooperating states and agencies include Alabama, Arizona, Arkansas, Georgia, Louisiana, Mississippi, Missouri, New Mexico, Oklahoma, South Carolina, Tennessee, Texas; Bureau of Agricultural Economics; Bureau of Plant Industry, Soils, and Agricultural Engineering; and Production and Marketing Administration, Cotton Branch.

<sup>10</sup> Appreciation is hereby expressed for the cooperation of the farmers, ginners and others who were interviewed, and for the data supplied by the Altus and Oklahoma City Classing Offices of the Production and Marketing Administration, U.S.D.A.

<sup>11</sup> *Hearings*, pp. 955-964, and *Yearbook of Agriculture*, *op. cit.*, p. 158.

Table I.—Advantages of Growing Only One Variety of Cotton as Reported by 128 Oklahoma Farmers in 1947.

Advantages	Number reporting
Keeps cotton planting seed pure	32
Price of cotton might or ought to be higher	29
Improves quality of cotton produced	9
Uniform quality is produced	6
Premiums are obtained on cottonseed for planting	6
Permits better ginning	5
Increases yields	6
Increases cooperation among farmers	2
<i>Other Replies</i>	
No opinion	6
Did not know what the advantages may be	9
No advantage	28

some inducement, such as a premium price for the cottonseed, is offered to farmers. Ginning is not contracted very often in Oklahoma, and shifts in patronage are fairly common. Unless the profit from pure seed equaled or exceeded the loss from reduced volume and/or the cost of inducements, a loss would be suffered.

The second limitation which is sometimes overlooked is that less than 10 percent of the cottonseed produced in this country is used for planting purposes<sup>12</sup>. Therefore the proportion of the cotton crop on which purity of seed would have a special value would also be less than 10 percent. At the present time, the amount of pure cottonseed that could be sold for planting would be less than the proportion of the crop used for planting because some farmers would not buy pure seed.

### Uniform Quality of Lint

Advocates of the one-variety plan usually assume that if only one variety of cotton was ginned at a gin the cotton produced would be of uniform quality. While this assumption seems logical, comments of cotton buyers and reports on grades and staples from one-variety gins indicate that a rather wide range of qualities comes from such gins<sup>13</sup>.

<sup>12</sup> U.S.D.A., Bur. of Agri. Econ., *Statistical Bul.* 99. "Statistics on Cotton and Related Data." p. 343. June, 1951.

<sup>13</sup> A "quality of cotton" as used in this discussion refers to a grade and staple combination such as Strict Low Middling 15/16" (SLM 15/16). "Qualities" refers to the various combinations of grades and staples.

## COMPARISON OF ONE-VARIETY AND MIXED-VARIETY GINS Range of Qualities Produced

To determine the uniformity of quality from one-variety gins, information on grades and staples was collected from the Oklahoma City Classing Offices on gins ginning only one variety, and on those ginning mostly one variety where the data on the minor varieties could be isolated. To permit comparisons, similar data were collected from nearby gins that ginned two or more varieties<sup>14</sup>.

The number of qualities of cotton produced by one-variety and comparable mixed-variety gins is shown in Table II. While the number of qualities was usually slightly less for the one-variety gins, the differences were small in most cases.

The mixed-variety Gins B<sup>15</sup> reported from four to six varieties, and the mixed-variety Gins Y reported from two to six varieties. The varieties reported from the mixed-variety gins had differences of as much as 5/32- to 3/16-inch in their average staple lengths in variety tests.

If the split grades (light-spotted and plus) are also used, the number of qualities is increased by nearly 50 percent (Table II). A significant factor is that the number of qualities is so large that only a very small number of bales could be in any one of them.

As measured by grade and staple, the concentration in the leading quality was sometimes greater for the one-variety gins than for nearby mixed-variety gins, but at other times the concentration was greater for the mixed-variety gins (Table III). While the concentration was rather high for one-variety Gin X in 1946-47, it was very low for that same gin in 1948-49.

The proportion of the ginnings in the five leading qualities for each year was greater for the one-variety gins (Table IV). But in two

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<sup>14</sup> The gins to be studied were selected after making combined mail and personal surveys to determine which Oklahoma gins ginned only one variety of cotton. These surveys covered directly 409 of the 440 active gins, and most of the others were covered indirectly. In the 1946-47 season, three gins ginned one variety, but the grade and staple data were available for only one. In the 1947-48 season, the cotton ginned by another gin was almost all of one variety, and information was available for separation of the qualities of the minor variety. In the 1948-49 season, similar data became available on still another gin. Thus, data were attained on three gins that ginned only or mostly one variety of cotton in the 1948-49 and 1949-50 seasons. Data were not available for the 1950-51 season from any one-variety gins. Of the three included in previous years, one became dormant, another ceased ginning only one variety, and the information available at the third gin was inadequate for separation of the qualities of the major and minor qualities.

<sup>15</sup> Data on Gins B consist of information on one gin for 1947-48 and on another gin for the other two seasons. Similarly, data on Gins Y consist of information on one gin for 1946-47, another for 1947-48 and 1948-49, and on still another for 1949-50. These changes in mixed-variety gins were made in order to keep the numbers of bales ginned as near as possible to those ginned by the one-variety gins.

of these cases the proportion by which the concentration of one-variety gins exceeded mixed-variety gins was only a fraction of a percentage point. The qualities that were leading one year were often not among the leading qualities in another year. The proportions in the five leading qualities varied over a large range at some of the one-variety

**Table II.—Number of Bales Ginned and Number of Qualities<sup>1</sup> of Cotton by Years From One-variety<sup>2</sup> and Mixed-variety<sup>3</sup> Gins.**

Year	Gin group I <sup>4</sup>			Gin group II <sup>4</sup>	
	(One-variety)		(Mixed-variety)	(One-variety)	(Mixed-variety)
	Gin A	Gin C	Gins B <sup>5</sup>	Gin X	Gins Y <sup>6</sup>
<b>1946-47</b>					
No. bales ginned	----	----	----	1317	1411
No. full grades*	----	----	----	49	57
<b>1947-48</b>					
No. bales ginned	179	----	213	794	730
No. full grades	35	----	39	49	49
No. split grades*	51	----	55	74	75
<b>1948-49</b>					
No. bales ginned	304	383	275	1014	1069
No. full grades	40	56	52	74	89
No. split grades	51	79	75	107	123
<b>1949-50</b>					
No. bales ginned	825	658	785	1088	950
No. full grades	45	41	51	50	51
No. split grades	72	70	81	77	78
<b>Average no. qualities</b>					
<b>2-year average B &amp; C</b>					
Full grades	----	48	51	----	----
Split grades	----	74	78	----	----
<b>3-year average</b>					
Full grades	40	----	47	58	63
Split grades	58	----	70	86	92
<b>4-year average X &amp; Y</b>					
Full grades	----	----	----	55	61

<sup>1</sup> A "quality" means a grade and staple combination. For example, Middling 15/16" is one quality and Strict Low Middling 31/32" is another.

<sup>2</sup> "One-variety" gins were so classified on the basis of reasonably reliable information that they either ginned only one variety, or produced quality information on the few bales of other varieties, those qualities being extracted before the data were used.

<sup>3</sup> "Mixed-variety" gins were selected as near as possible to a one-variety gin or gins in order that a gin with approximately the same volume of ginning could be found. Other factors were kept as similar as possible except for the "variety" factor as mixed-variety gins ginned from two to six varieties.

<sup>4</sup> Gins within "Groups" are sets for comparison, and are loaded close together.

<sup>5</sup> "Gins B" were two gins; one used in the calculations the first year, and the other two used the second and third years. "Gins Y" were three gins; one used the first year, another the second and third years, and still another the fourth year. These changes were made in order to secure similar volumes from the one-variety gin or gins with which they are compared.

<sup>6</sup> "Full grades" means the regular grades used by the U.S.D.A. without the sub-division into "plus" and "light-spotted" qualities. "Split grades" includes the sub-divisions of "plus" and "light-spotted" qualities used since 1947-48. These latter qualities are combined with regular grades in "Full grades," but are counted as separate qualities in "Split grades."

Table III.—The Percentage of the Cotton Ginned That Was in the Leading Quality (Full Grades) Each Year at One-variety and Mixed-variety Gins.  
(Percentage in leading quality each year)

Year	Gin group I		Gin group II		
	(One-variety)		(Mixed-variety)	(One-variety)	(Mixed-variety)
	Gin A	Gin C	Gins B	Gin X	Gins Y
1946-47	----	----	----	37.1	15.5
1947-48	14.5	----	15.0	11.4	15.7
1948-49	18.7	8.8	11.6	6.4	6.3
1949-50	14.3	14.7	15.1	12.6	21.1
<i>Average Percentages</i>					
2-year average Gins B & C	----	11.8	13.3	----	----
3-year average Gins A & B	15.8	----	13.9	----	----
4-year average Gins X & Y	----	----	----	16.9	14.8

Table IV.—The Percentage of the Cotton Ginned That Was in the Five Leading Qualities (Full Grades) Each Year\* at One-variety and Mixed-variety Gins.  
(Percent)

Year	Gin group I			Gin group II	
	(One-variety)		(Mixed-variety)	(One-variety)	(Mixed-variety)
	Gin A	Gin C	Gins B	Gin X	Gins Y
1946-47	----	----	----	68.6	46.8
1947-48	42.5	----	44.1	43.5	48.6
1948-49	53.7	32.1	35.3	26.9	26.4
1949-50	52.0	50.6	44.7	56.2	56.1
<i>Averages</i>					
2-year average Gins B & C	----	41.3	40.0	----	----
3-year average Gins A & B	49.4	----	41.4	----	----
4-year average Gins X & Y	----	----	----	48.8	44.5

\* These five leading qualities are for each year separately. The five qualities were different for different years. Only one of the qualities was among the leaders at Gins A, B, and X for all the years reported.



gins. Increases or decreases between seasons in the proportions in the five leading qualities were large, amounting often to about 50 percent.

If a gin or community is to establish and maintain a reputation as a market outlet for a given quality or qualities of cotton, such quality or qualities must be produced consistently season after season. The number of bales of the quality that led at the one-variety gins in the earliest year for which data are available varied over a wide range in the following years (Table V). For example, Gin A produced 26 bales of Low Middling 15/16" in the 1947-48 season, only four bales of that quality in 1948-49, and 105 bales in 1949-50.

When the five leading qualities in the first year for which data were available were examined in later years, it was found that wide fluctuations existed in both the number of bales in the qualities and the proportions of the ginnings represented by such qualities (Table VI). Furthermore, some qualities that were among the five leading ones in the first year were entirely absent in subsequent years. The production was varied and irregular to such an extent that the number of bales or proportion of ginnings in a given quality for a given season gave practically no indication of what to expect in that quality in following seasons.

Table V.—Number of Bales and Percent of Ginnings in the Leading Quality (Full Grades) of One-variety and Mixed-variety Gins for the Earliest Years and in That Same Quality in Later Years.

Year	Gin group I			Gin group II	
	(One-variety)		(Mixed-variety)	(One-variety)	(Mixed-variety)
	Gin A	Gin C	Gins B	Gin X	Gins Y
Largest quality first year for which data were available:	LM 15/16	SLM 15/16	LM 7/8	LM 15/16	LM 15/16
1946-47					
No. bales	----	----	----	488	218
Pct. of ginnings	----	----	----	37.1	15.5
1947-48					
No. bales	26	----	32	43	95
Pct. of ginnings	14.5	----	15.0	5.4	13.5
1948-49					
No. bales	4	33	6	20	24
Pct. of ginnings	1.3	8.8	2.2	2.0	2.2
1949-50					
No. bales	105	97	13	140	98
Pct. of ginnings	12.7	14.7	1.7	12.8	10.6

**TABLE VI.—Percentage of Cotton Classed and Number of Bales for the Five Leading Qualities at One-variety and Mixed-variety Gins the First Year Information Was Available, and the Same Information on These Qualities in Later Years.**

Rank	First		Second		Third		Fourth		Fifth	
	Percent	No. bales	Percent	No. bales	Percent	No. bales	Percent	No. bales	Percent	No. bales
<i>Group I Gins</i>										
<i>One-variety, Gin A</i>										
Qualities:	<u>(LM 15/16)</u>		<u>(SLM 31/32)</u>		<u>(SLM 15/16)</u>		<u>(SLM 7/8)</u>		<u>(SGO 7/8)</u>	
1947-48	14.5	26	9.5	17	8.9	16	5.8	9	5.6	10
1948-49	1.3	4	5.6	17	11.0	33	18.7	57	----	0
1949-50	12.7	105	7.5	62	14.3	117	1.5	13	----	0
<i>Mixed-variety, Gin B</i>										
Qualities:	<u>(LM 7/8)</u>		<u>(SGO 7/8)</u>		<u>(LM 15/16)</u>		<u>(LM 29/32)</u>		<u>(SLM 15/16)</u>	
1947-48	15.0	32	9.0	19	7.0	15	5.1	11	5.1	11
1948-49	2.2	6	---	0	4.0	11	1.1	3	9.8	27
1949-50	1.7	13	---	0	15.1	119	4.0	39	3.6	28
<i>One-variety, Gin C</i>										
Qualities:	<u>(SLM 15/16)</u>		<u>(M 1)</u>		<u>(M 15/16)</u>		<u>(M 31/32)</u>		<u>(SLM 31/32)</u>	
1948-49	8.8	33	8.7	33	5.6	21	5.1	19	3.9	15
1949-50	14.7	97	0.6	4	1.5	10	1.5	10	10.8	71
<i>Group II Gins</i>										
<i>One-variety, Gin X</i>										
Qualities:	<u>(LM 15/16)</u>		<u>(SGO 15/16)</u>		<u>(LM 31/32)</u>		<u>(SLM Sp. 15/16)</u>		<u>(SGO 31/32)</u>	
1946-47	37.1	488	11.2	147	8.7	115	6.1	80	5.5	72
1947-48	5.4	43	0.9	7	0.5	4	---	0	---	0
1948-49	2.0	20	0.4	4	0.5	5	4.2	43	0.1	1
1949-50	12.8	140	0.8	9	7.3	80	1.8	20	0.3	3
<i>Mixed-variety, Gin Y</i>										
Qualities:	<u>(LM 15/16)</u>		<u>(LM 1)</u>		<u>(LM 31/32)</u>		<u>(SLM Sp. 15/16)</u>		<u>(SGO 15/16)</u>	
1946-47	15.5	218	10.6	150	8.3	117	7.2	101	5.2	73
1947-48	13.5	95	2.7	19	4.7	33	---	0	0.1	1
1948-49	2.2	24	2.7	29	1.0	10	1.5	16	0.6	6
1949-50	10.6	98	4.4	40	7.1	65	3.1	28	0.2	2

Since the weather has such an important effect on cotton grades, considerable variation along this line could be expected between seasons.

Range in Staple Lengths

Staple length has been closely associated with varieties. It would, therefore, seem logical to expect less variation in staple length from gins that ginned one variety than from those ginning two or more varieties. Nevertheless, fluctuations in the proportion of the ginnings of the various staple lengths from year to year were about as great for the one-variety gins as for those ginning several varieties (Table VII). For example, one-variety gins and mixed-variety gins had a range of

Table VII.—Percentage of Cotton in Various Staple Lengths at One-variety and Mixed-variety Gins.  
(Percent)

Group	Staple lengths in 32nds of an inch									
	26	28	29	30	31	32	33	34	35	36
<i>Group I Gins</i>										
Gin A (One-variety)										
1947-48	3.4	19.0	10.6	32.3	17.9	11.7	2.8	2.3	---	---
1948-49	1.3	26.9	13.5	22.5	8.5	17.0	9.3	1.0	---	---
1949-50	---	4.5	123.0	42.0	17.0	17.5	5.4	12.0	---	0.1
Difference between Highs and Lows-3 yrs.	3.4	22.4	2.9	19.5	9.4	5.8	6.5	1.3	---	0.1
Gins B (Mixed-variety)										
1947-48	8.4	34.3	15.0	28.1	12.7	1.5	---	---	---	---
1948-49	0.4	18.8	14.0	32.0	12.1	18.6	3.7	0.4	---	---
1949-50	1.3	1.2	12.5	30.4	19.6	16.9	6.1	1.2	---	---
Difference between Highs and Lows-3 yrs.	8.0	33.2	2.5	3.9	7.5	17.1	6.1	1.2	---	---
Gin C (One-variety)										
1948-49	0.3	12.9	11.5	32.7	16.1	22.1	3.8	0.6	---	---
1949-50	0.1	3.2	9.3	34.3	23.3	20.2	7.4	2.2	---	---
<i>Group II Gins</i>										
Gin X (One-variety)										
1946-47	0.5	3.8	5.7	62.0	18.1	9.2	0.5	0.2	---	---
1947-48	5.2	26.6	14.3	41.1	10.6	2.2	---	---	---	---
1948-49	0.4	18.1	14.5	34.5	11.5	10.0	8.3	2.7	---	---
1949-50	0.1	1.5	9.5	46.4	23.7	11.3	5.5	1.9	0.1	---
Difference between Highs and Lows	5.1	25.1	8.8	27.5	13.1	8.1	8.3	2.7	0.1	---
Gins Y (Mixed-variety)										
1946-47	6.3	9.6	5.2	38.2	6.8	20.4	2.7	0.8	---	---
1947-48	3.8	14.0	11.1	42.7	20.8	7.1	0.5	---	---	---
1948-49	1.0	15.6	11.3	27.0	11.7	19.6	9.7	3.8	0.3	---
1949-50	1.1	4.5	8.0	44.7	25.8	12.7	2.8	0.3	0.1	---
Difference between Highs and Lows	5.3	11.1	6.1	17.7	19.0	13.3	9.2	3.5	0.3	---

eight staple lengths most years. One-variety Gin X had a range of nine staple lengths in 1949-50, and mixed-variety Gins Y had a range of nine staple lengths in 1948-49 and in 1949-50.

### Other Variations

Information was not available on the factors included under "character" of cotton for making comparisons between the one-variety and mixed-variety gins. Some information on these factors was available for part of the cotton from Gin X in the "Fiber and Spinning Test Results," published by the Production and Marketing Administration, Cotton Branch, U.S.D.A., for 1946, 1947, and 1948.

The wide variations in the grades and staples reported above suggest that considerable variation may also exist between seasons in the factors included under character. At Gin X the fibers varied from "fine" to "slightly coarse" (or from 3.7 to 5.2) in 1946 and 1948<sup>16</sup>. Fiber maturity ranged from "average" to "very mature," and neps count ranged from "low" to "high." The uniformity ratio of the fibers was fairly constant. The tensile strength of 22 yarns ranged from "poor" to "very good." So several of the features included under character did change considerably from season to season at this gin on the same variety.

Variation rather than regularity is typical of cotton qualities. This appears reasonable if the extreme sensitivity of cotton to environmental conditions and the wide differences in such conditions are closely observed. Furthermore, cotton has been found to vary 6/16-inch in staple length between bolls close together on the same plant<sup>17</sup>. Perhaps the hybrid ancestry of most types of cotton contributes to the variations as well as do differences in fertility, moisture, and other factors that have significant effects on cotton growth<sup>18</sup>.

### QUALITIES OF COTTON PURCHASED BY MILLS

Cotton mills use a considerable range in qualities of cotton for the manufacture of a given type of fabric<sup>19</sup>. But individual mills buy most of their cotton in even-running lots (of the same grade and staple). A study in South Carolina found that over 82 percent of the cotton was

<sup>16</sup> PMA, Cotton Branch, U.S.D.A. "Fiber and Spinning Test Results for Some Upland Cottons Grown in Selected Standardized-variety Areas. Crop of 1946." p. 12. Dec., 1946, and PMA, Cotton Branch, U.S.D.A. "Summary of Fiber and Spinning Test Results for Cotton Varieties Grown by Selected Cotton Improvement Groups. Crop of 1948." p. 17. Jan., 1949.

<sup>17</sup> Armstrong, G. M. and C. C. Bennett, "Some Factors Influencing the Variability in Length of Cotton Fibers on Individual Plants as Shown by the Sorter Method." *Jour. of Agri. Res.*, Vol. 47. p. 449. Oct. 1, 1935.

<sup>18</sup> Brown, H. B., *Cotton*. Second edition. New York. McGraw-Hill Book Co., 1938.

<sup>19</sup> PMA, Cotton Branch, U.S.D.A. "Market Outlets for Cotton in Some of the Principal Cotton Fabrics." p. 100. Feb. 1, 1950. Processed.

bought by mills in even-running lots<sup>20</sup>. Mills which manufactured fine yarns bought a much larger proportion of the cotton they used in even-running lots than did mills which made coarser yarns<sup>21</sup>.

Because of the wide fluctuations in the qualities and quantities of cotton produced in Oklahoma from year to year, it would be impossible to assemble the production of one-variety gins into even-running lots of the same quality and quantity that would be consistently of greater value. If the producing area were enlarged to several times the present size, more even-running lots of the leading qualities might be assembled; but the number of other qualities would also increase, and quantities would vary widely.

Sorting cotton by means of classing, or by the use of laboratory tests where finer sortings are needed, seems to be more practical on Oklahoma cotton than attempting to produce uniform qualities by planting one variety per gin territory. The use of laboratory tests has been increasing rapidly in recent years and will probably continue to do so<sup>22</sup>.

Blending at mills or at gins may offer a solution or partial solution to the demand for uniform qualities of cotton. Blending, or mixing of different bales, is reported to be a common practice to some degree at most or all mills. Perhaps blending deserves further research as a solution to problems posed by variation in the qualities of cotton as produced on farms.

### Cash Returns

Almost one-fourth of the farmers interviewed thought that the price of cotton at one-variety gins might be, or ought to be, higher than at other gins. This feeling was generally based on the idea that the cotton would be of even-running quality and consequently worth more. However, none of the farmers interviewed had received any extra premium for producing a certain variety of lint, although a few had received some premiums for producing pure planting seed.

The fluctuations in qualities and quantities reported above for one-variety gins do not indicate any basis for larger cash returns. So the source for larger cash returns, if any, would be from the production of pure planting seed. The owners of all but one of the gins that ginned mostly or only one variety were active in the production of pure planting seed, and that was the motive for ginning one variety. The one gin

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<sup>20</sup> Smith, J. R. and W. T. Ferrier, "Cotton Buying Procedures and Practices of South Carolina Cotton Mills." *S. C. Agri. Exp. Sta. of Clemson Agri. College. Bul.* 388. p. 28. July, 1950. Processed.

<sup>21</sup> PMA, *Cotton Branch, U.S.D.A.* "Cotton Mill Requirements as Related to Improved Cotton Quality and Marketing Practices." pp. 11-13. July, 1947. Processed.

<sup>22</sup> PMA, *Cotton Branch, Research and Testing Division, U.S.D.A.* "Practices of Textile Manufacturers in the Purchase of Cotton." p. 3. Feb., 1952. Mimeo.

owner who was not active in pure seed production was in an isolated location and was able to persuade all of the farmers to grow the variety that he favored.

### Other Advantages

Probably fewer changes would be needed in the adjustments of gin machinery if only one variety were ginned. However, the convenient and automatic adjustments of modern gins reduce the importance of this to some extent. Furthermore, the wide range in the qualities of cotton produced by a single variety within gin territories in Oklahoma would apparently create a need for about as many adjustments as would be needed for two or more varieties.

Better yields are given as an advantage of growing only one variety of cotton. If the variety selected continued to make the highest yield, this might be a significant advantage, but variety tests indicate that the highest yielding variety one year may not be the highest the next year<sup>22</sup>.

### DISADVANTAGES

The disadvantages that accompany the production of only one variety of cotton have received scant attention, and their existence has been questioned<sup>23</sup>. However, most of the 128 Oklahoma cotton farmers interviewed reported disadvantages of growing only one variety. More than half of them reported as a disadvantage the differences in adaptation of cotton varieties to the several kinds of soil within gin territories (Table VIII). The frequency of this opinion is probably the major influence on the varieties of cotton planted in Oklahoma. Other disadvantages were noted, but they were reported less often.

### Differences in Adaptation of Varieties

In addition to the farmers' observations and experiences along such lines, variety tests have shown that there are important differences in the adaptation of varieties to kinds of soils. In Oklahoma, differences were reported both between areas or locations and between conditions that frequently differ within an area as a gin territory, or even on adjoining farms, or a single farm<sup>24</sup>.

In Tennessee, differences in the adaptation of varieties that would apply between adjoining farms or on a given farm were reported as

<sup>22</sup> Parrott, I. M., N. M. Gober and J. M. Green, "Oklahoma Cotton Variety Tests, 1944 to 1948." *Okl. Agri. Exp. Sta. Tech. Bul.* T-37. p. 15. Feb., 1950.

<sup>23</sup> Cook, *op. cit.*, p. 3.

<sup>24</sup> Parrott, et. al. *op. cit.* pp. 3 and 7.

Table VIII.—Disadvantages of Growing One Variety of Cotton as Reported by 128 Oklahoma Farmers.\*

Disadvantages	Number reporting
Different varieties are better on different kinds of soils within area involved	66
Different varieties are better for early and late plantings	7
Two or more varieties reduces risks on yields and harvesting losses	3
The varieties selected may be or were unsatisfactory	12
Farmers can now buy better seed than they can grow	1
Prices received are no higher	3
Do not know what the disadvantages may be	13
None	21

\* Seven of the 128 farmers interviewed for this study gave no opinion, while a few gave more than one disadvantage.

follows: "Selection of variety depends to a great extent upon the local situation of the grower; his land, whether bottom or upland, of low or high fertility, his labor supply; and his market."<sup>25</sup> Similar differences were reported by H. B. Brown<sup>27</sup>.

Because the degree of adaptation of varieties fluctuates, it appears that the growing of several varieties is often the most profitable within small areas where differing types of soils and other growth factors are common.

### Other Disadvantages

The selection of unsatisfactory varieties was probably reported as a disadvantage by farmers (Table VIII) because of the degrees of adaptation of varieties to different kinds of soils, inconsistent results obtained on similar soils in different seasons, or still other reasons. At least it indicates that a good many farmers doubt that a definitely superior variety can be found for all farms in a gin territory.

Variety tests planted on the same dates show considerable fluctuations in the rank of varieties from year to year<sup>28</sup>. H. B. Brown recognized that the value of varieties differs with seasons and growth factors<sup>29</sup>.

<sup>25</sup> McMurray, S. F., "Variety Performance Trials of Corn, Oats, Barley, Wheat, Soybeans, and Cotton." *Univ. of Tenn. Agri. Exp. Sta. Bul.* 208. p. 13. Jan., 1949.

<sup>27</sup> Brown, *op. cit.* p. 45.

<sup>28</sup> Parrott, et al, *op. cit.*, pp. 15, 21, 28, and 37.

<sup>29</sup> Brown, *op. cit.*, p. 45.

Better cotton varieties can be chosen fairly satisfactorily from averages of yields and other factors. However, differences of progress in breeding of the many varieties, changes in the importance attached to the various characteristics, and changing performances from season to season make it difficult, if not impossible in many areas, to choose the best variety for all the farms of a given area.

Many Oklahoma farmers plant varieties of medium maturity for their first and second plantings, but if they have to replant late in the season, they prefer very early- or quick-maturing varieties. This practice seems more common on the basis of comments by gin managers than is indicated by Table VIII. Gin managers frequently report shortages of the early-maturing varieties of seed for replanting after hail or other storms late in June.

A few of the farmers interviewed reported that growing two or more varieties reduced risks, as compared to growing only one variety. While direct comparisons cannot be made, it would seem that diversification of varieties with different maturity rates would reduce the danger of unfavorable periods of weather in both the growing and the harvesting seasons. It would also permit better use of a limited supply of labor.

Whether farmers can now buy better cottonseed than they can grow likely varies with the seasons, the qualities of seed that can be purchased, and other factors. However, as cotton planting seed becomes a more specialized commodity, it may be that farmers will be able to buy cottonseed for planting cheaper than they can produce it.

## **NUMBER OF VARIETIES NEEDED**

From an economic viewpoint, the number of cotton varieties that is needed is the number that will produce the maximum net returns. That number would vary with time and developments. Too many varieties would create excessive costs because so many facilities would have to be maintained. But too few varieties would prevent cotton farmers and others from making the progress and obtaining the returns that would otherwise be possible.

While competition between varieties of cotton has involved considerable cost, it has instrumented the better adaptation of varieties to kinds of soils, as well as other advancements. For example, storm resistance and adaptation to mechanical stripping are characteristics of prime importance in Western Oklahoma at present. Competition between cotton breeders and trial plantings by farmers have caused faster progress in the development of these characteristics and in the use of machines to harvest the cotton than would likely have occurred with fewer varieties or less competition.



If all the farmers of an area grow only one variety of cotton, they run the risk of missing new developments in other varieties. Even local experimental plots may not give the same results that would be obtained from field trials on various kinds of soils involving different farm operations.

Disadvantages in having too few varieties and too few cotton breeders may thus equal or exceed the disadvantages of too many varieties. Competition and developments may offer a solution for the optimum number of varieties of cotton.

## CONCLUSIONS

The production of pure planting seed is the major advantage of producing only one variety of cotton per gin in Oklahoma. However, less than 10 percent of the cottonseed produced in the United States is used for planting purposes, thus placing a rather low limit on the need for production of pure seed.

The cotton produced at one-variety gins in Oklahoma differed widely in quality as measured by grade and staple. In fact, the number of qualities produced by one-variety gins was almost as large as from those ginning two or more varieties. In some cases the year-to-year variation was even greater from gins ginning one variety than from gins ginning several varieties. The qualities varied so widely that it does not seem likely a profitable uniformity can be obtained. Therefore, there appears to be no basis for greater cash returns from the lint of one-variety cotton.

The differences in adaptation of the many cotton varieties to the various types of soils and differences in maturity rates are the basis of the major disadvantages of growing only one variety of cotton in Oklahoma. Until farmers become convinced that some variety is well adapted to all the kinds of soils in an area and is the best all-around variety, it is doubtful if one variety of cotton will, or should be produced beyond the amount required to produce planting seed.

In Oklahoma under present conditions, one-variety cotton production is economically valuable only as far as the growth of cotton planting seed is concerned. But even this value is reduced or exceeded by the advantages of two or more varieties in some areas and on some farms.

The qualities of cotton that mills need can be approached closer and at less cost on Oklahoma cotton through sorting by cotton classers, and perhaps by the application of laboratory tests where finer distinctions are needed, than by attempting to grow even-running lots by planting only one variety. Blending at mills or gins may provide a partial solution to the problems created by variation in cotton qualities. Fiber tests may also provide part of a solution.