

Report on Missouri Cotton Experiment Fields; 1925

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Cotton production in Southeast Missouri and the southern Ozark counties has grown rapidly in importance since 1921. A marked extension of the area of production has occurred since that time. The acreage and total yield of the Missouri cotton crop from 1921 to 1925 inclusive are as follows:

Year	Acreage	Total yield in bales
1921.....	103,000	70,000
1922.....	198,000	143,000
1923.....	355,000	126,280
1924.....	483,000	189,000
1925.....	487,000	260,000*

To meet the increased demands for information on the cotton crop as it was carried to new farm conditions and inexperienced growers, the Missouri College of Agriculture began a series of experiments in 1924. These experiments were designed primarily to determine the most productive varieties, the best kinds of fertilizer to use, and the proper distance to space plants in the row on the leading soil types of the south and southeast part of the State. A progress report on these investigations is given in Missouri Experiment Station Circular 132. It gives the general plan of the experiments, location and soil characteristics of the fields on which the experiments were conducted in 1924. It gives also a brief summary of the results obtained, the principal points of which are as follows:

(1) The varieties Trice and Delfos gave the best results on the heavy soils, while Express and Acala gave the best results on the lighter soils.

(2) Two to four plants in hills spaced 10 to 12 inches apart gave higher acre-yields, as a rule, than single plants in hills spaced 12 or 18 inches apart.

(3) The only treatments that produced consistent and significant increases in yield were (a) a combination of 300 pounds of acid phosphate, 50 pounds of sodium nitrate, and 30 pounds of potassium chloride, per acre; or (b) a combination of 300 pounds of acid phosphate and 30 pounds of potassium chloride, per acre. Each of these treatments gave a return of approximately \$5 per acre above the cost of the fertilizer. These returns are based on the

*Preliminary estimate

average yields of seven fields located on four representative soil types of the section.

LOCATION OF EXPERIMENT FIELDS IN 1925

Experimental work with cotton in Missouri during 1924 was confined to the leading soil types of the Southeast Missouri lowlands. In 1925, however, the work was extended to include the uplands of the southern and central parts of the State. The approximate location and general soil characteristic of the fields used in 1925 are as follows:

(1) The Wyatt field is located about one mile west of Wyatt on C. R. Moreton's farm. The soil is representative of a large area of the heavy soils found in the eastern half of Mississippi County. It is similar to the Charleston

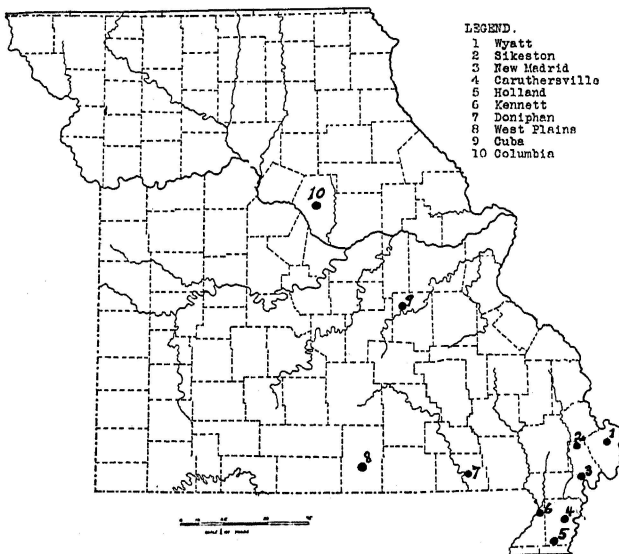


FIG. 1.—Location of Missouri Cotton Experiment Fields.

field used in 1924 in that the surface soil consists of a black, mellow silty clay loam that extends to a depth of 12 to 15 inches. It is well supplied with organic matter and plant food, and is very productive of cotton, alfalfa, corn and small grains.

(2) The Sikeston field is located four miles south of Sikeston on the Sikeston Ridge. The soil is classed as Lintonia silt loam and is representative of a large part of the ridge. It is rather low in organic matter and plant food, but its great depth and excellent physical properties partially offset these deficiencies to make it a fairly productive soil.

(3) The New Madrid field is located on the extreme south end of the Sikeston Ridge. The soil is a distinct variation from the silt loam type that prevails on most of the ridge in that it has a higher content of fine sand.

(4) The Caruthersville field, operated by Mr. A. A. Sides, is located about four miles west of Caruthersville. It is principally a silt loam, but wide variations from this mixture should be noted. The soil is deep and fertile and is fairly representative of the loamy soils of Pemiscot County. These soils are exceptionally well adapted to cotton. Yields of a bale to the acre in favorable seasons are not uncommon.

(5) The Holland field is located immediately north of Holland. The soil is a sandy loam of the Sarpy series. It is similar in many respects to the soil of the Caruthersville field, but contains a greater proportion of sand.

(6) The Kennett field which was operated by the Missouri College of Agriculture from 1916 to 1924 was released the past season and another field established four miles south of Kennett. The soils of that area belong to the Lintonia series. They are a dark brown fine sandy loam of moderate fertility. Due to excessive rains and shortage of labor much of the cotton was lost on this field before it could be harvested. Consequently no records were made of the plot yields. However, careful observations and boll counts were made to serve as a basis on which to estimate the relative performance of the various treatments and varieties.

(7) The Doniphan field is located three miles Southeast of Doniphan on Clarksville silt loam. Like most of the Ozark upland soils, this soil is characterized by its thin, droughty nature, and low content of organic matter and plant food.

(8) The fields at Cuba and West Plains are also located on thin Ozark upland soil.

(9) The tests at Columbia were conducted on the Experiment Station Field on soil somewhat lower in fertility than the average upland soils of that vicinity.

EXPERIMENTAL RESULTS IN 1925

Variety Tests.—A number of varieties which have been tested in the State during the past several years and found to be unadapted to the soil and climatic conditions were not included in the tests of 1925. Only those varieties considered as having special merits under Missouri conditions were included.

TABLE 1.—LOCATION OF COTTON EXPERIMENT FIELDS AND YIELDS OF SEED COTTON PER ACRE

Variety	Sikes- ton	New Madrid	Caruth- ersville	Wyatt	Doni- phan	Holl- and	West Plains	Col- umbia	Cuba
Trice (Burdette)-----	1501	1679	1980	1693	352	1879	324	1320	533
Delfos-----	1440†	1530*	2175†	2129	272	1645*	288†	1028†	279†
Express (Burdette)-----	1433	1751	1935	1955	416	2117	388	1008	---
Acala (Nunn's)-----	1256	1757	1777	2078	308	2061	348	1028	---
Cleveland Wannamaker.	1071	1595	1860	1816	---	---	---	---	---
Half-Half-----	1157	1702	1687	1775	---	---	---	---	---
Cleveland (Coker)-----	1097	---	---	---	---	---	---	---	---
Trice (Miss. Expt. Sta.)	1495	---	1950	1826	---	---	---	---	---
Express (Coker)-----	1495	---	---	1739	---	---	---	---	---
Acala (home grown)-----	---	1828	---	---	---	---	---	---	---

*Delfos No. 911. †Delfos No. 6102.

The tests were conducted in triplicate two-row plots in the Southeast Missouri lowlands, and in single series of four- or six-row plots on the Ozark uplands and at Columbia. The results of the tests are given in Table 1. The

first five columns (at left) show the results of the tests in the lowlands, while the remaining columns give the results obtained from the upland soils.

It may be seen from the table that Trice ranked first in yield of seed cotton at Sikeston. Delfos ranked first at Caruthersville and Wyatt, while Acala and Express ranked first in yield at New Madrid and Holland respectively. As previously indicated, no plot yields were recorded from the Kennett field, but Acala apparently was the highest yielding variety in the test.

Trice and Express gave the best yields on the Ozark upland soils. It may be noted, however, that all of these yields were low, as the result of a season that was very dry and unfavorable to all crops on most of the Ozark upland



Fig. 2.—These nine closely spaced plants produced 60 well developed bolls.

soils. Even in favorable seasons these soils are comparatively unproductive, and will seldom produce, on an average, more than 15 bushels of corn or 8 bushels of wheat per acre.

Trice ranked first in yield of seed cotton at Columbia, but the other varieties gave satisfactory results. Approximately 90 per cent of the Trice and Delfos bolls opened before frost, and produced a good quality of cotton.

Spacing Tests.—Table 2 shows the effect of close and wide spacing of the plants on yield. The spacings varied from 2 to 4 plants in hills 10 to 12 inches apart (an average of one plant every 3 or 4 inches in the row) up to an 18-inch spacing in the row. The plants in hills spaced 10 to 12 inches apart gave an average yield in seed cotton of 229 pounds more than single plants spaced 12 inches apart, and 327 pounds more than single plants spaced 18 inches apart.

Still greater increases may be expected from close spacing on soils that normally produce very small cotton plants.

TABLE 2.—LOCATION OF COTTON SPACING TESTS AND YIELD OF SEED COTTON IN POUNDS PER ACRE.

Spacing of plants in rows	Caruthersville	Sikeston	Wyatt	Columbia
2 to 4 plants per hill, hills 10-12 inches apart	2156	1654	2090	936
1 plant every 12 inches	1930	1484	1798	---
1 plant every 18 inches	1760	1407	1713	648

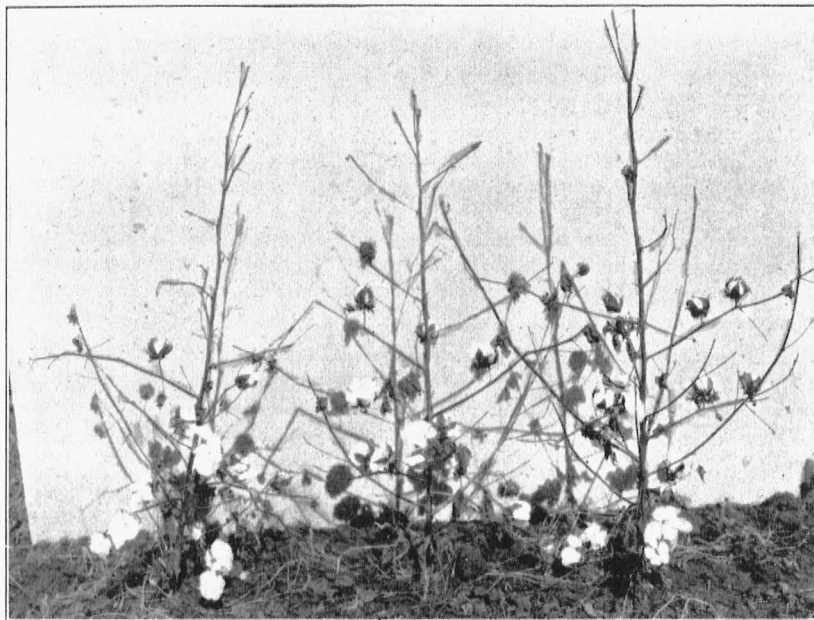


Fig. 3.—These three widely spaced plants covering as much soil space as those in Fig. 2, produced only 40 well-developed bolls. The bolls from the two sets of plants were equal in size.

Fertilizer Tests.—Fertilizer tests were conducted on all of the lowland fields except Holland, and on the Ozark upland at Doniphan. The different kinds, combinations and rates of application of fertilizer were the same as those used in 1924 and are as follows:

Sodium nitrate, 50 pounds

Sodium nitrate, 100 pounds

Acid Phosphate, 300 pounds

Acid phosphate, 300 pounds; sodium nitrate 50 pounds

Acid phosphate, 300 pounds; sodium nitrate 50 pounds; potassium chloride, 30 pounds.

Acid phosphate, 300 pounds; potassium chloride, 30 pounds.

The combination of 300 pounds of acid phosphate and 50 pounds of sodium nitrate were omitted from the test at Wyatt and Caruthersville, and an application of sodium nitrate alone was omitted from the Doniphan field.

These tests were made in duplicate four-row plots at New Madrid, Caruthersville and Wyatt, and on a single series of six-row plots at Kennett, Sikeston and Doniphan. Every third plot in each series was left as a check, thus placing each treated plot next to an untreated plot.

The results obtained from the fertilizer tests on the lowland fields are comparable in a general way with the 1924 results. Applications of 50 or 100 pounds of sodium nitrate failed to give a significant increase in yield on any of the fields. Acid phosphate applied alone at the rate of 300 pounds per acre gave an average increase of over 43 pounds of seed cotton per acre. The combination of 300 pounds of acid phosphate and 50 pounds of sodium nitrate, included only at New Madrid and Sikeston, gave an average increase of 10 pounds of seed cotton per acre.

Combinations of 300 pounds of acid phosphate, 50 pounds of sodium nitrate, and 30 pounds of potassium chloride, gave increases ranging from 55 to 138 pounds of seed cotton per acre, with an average increase of 96 pounds. Acid phosphate at the rate of 300 pounds, combined with 30 pounds of potassium chloride, gave an average increase of 70 pounds of seed cotton per acre. On the basis of prices received for cotton in 1925 the value of these increases from the two last named treatments is approximately equal to the cost of the treatments in each case.

On the Doniphan field the combination of acid phosphate, sodium nitrate and potassium chloride gave an increase of 176 pounds of seed cotton per acre, which because of the comparatively low yields on this field, represents an increase of 41 per cent. Acid phosphate and potassium chloride combined, and acid phosphate alone, gave percentage increases of 33 and 20 respectively. In view of the fact that these increases were obtained in an exceptionally dry season, they seem to indicate the desirability of a liberal use of complete fertilizer for cotton on the thin Ozark uplands.

SUMMARY

The general plan, location and results of variety, spacing, and fertilizer tests with cotton in Missouri during the season of 1925 are given in this report. A brief summary of the most important results obtained in 1924 is also included.

In both seasons, Trice, Delfos, Express and Acala were the highest yielding varieties in the tests. Acala and Express gave the best returns, as a rule, on the lighter soils, while Trice and Delfos gave the highest yields on the heavy or very fertile soils.

Two to four plants in the hill with the hills spaced 10 to 12 inches apart in the row gave higher acre yields than single plants spaced 12 or 18 inches in the row.

Of the fertilizer treatments used on the Southeast Missouri lowlands for cotton during 1924 and 1925, a combination of acid phosphate, sodium nitrate and potassium chloride, or a combination of acid phosphate and potassium

chloride gave more consistent and, on an average, a more economical increase in yield than the other treatments. The increases in 1924 represented a return of about \$5 an acre, while the value of the increases obtained in 1925 was about equal to only the cost of the treatments.