Cotton Varieties for Southeast Missouri

Delfos on Rich Loamy Soil

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THIS BULLETIN AT A GLANCE

This bulletin reports three years of experiments with the five best varieties of cotton for Southeast Missouri. The yields of lint and the money value of same per acre from each of these varieties are recorded from trials on four types of soil corresponding to the numbered regions on the map shown below.

Delfos was the best yielding variety on the clay loam and heavy loam of Regions 1 and 3, but lacks the vigor of plant growth required on the thinner soils of Regions 2 and 4. It is not adapted to the poorer soils of Region 3.

Express has a wide range of adaptation to the different soil conditions. It is early enough for the rich soils and also meets the requirements for vigorous growth on the sandy soils.

Fig. 1.—Outline map of the principal soil regions of the Southeast Missouri lowlands that are used extensively for cotton production.

Acala does well on the lighter soils, being superior to all others on the fine sandy soils of only moderate fertility.

Trice, a short staple variety, has not made a good showing in the comparison of yields. Its chief value is that it matures early and is therefore less subject to frost damage than most other varieties. It is noted, moreover, that there are better strains of Trice than the one included in these trials.

Wannamaker-Cleveland ranked first in yield on the sandy soils of Region 2, but was fourth in the money value of lint per acre. The tendency of this short-staple variety to make a rank growth marks it as adapted only to the sandy soils of medium to low fertility.
Cotton Varieties for Southeast Missouri

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The purpose of a cotton variety test is to determine the most productive variety for soils of similar character. Productivity may be measured in terms of yield per acre, or in terms of money value per acre. Varieties respond differently to soils of unlike character, and on the same soil they respond differently to unlike seasons. If, therefore, the results of variety testing are to have a general application, tests must be conducted on the different kinds of soils through a period of years.

During the past three years, 1924, 1925 and 1926, the Missouri College of Agriculture has conducted cotton variety tests on all of the leading soil types of Southeast Missouri that are used extensively for cotton production. Twenty-one varieties and strains have been included in one or more tests. A number of these were found to be unadapted to Missouri conditions and were eliminated. Only five varieties have been included regularly in all of the tests—a small number in the great list of varieties known actually to exist. Many varieties, however, are not genuine; they are old types or mixtures of types under new names. Yet these are widely sold to farmers. Some varieties, although specially adapted to other sections of the cotton belt, could be safely excluded from these tests because of undesirable vegetative characters or lack of earliness, for Missouri requires at least a medium early variety that does not produce an excessive vegetative growth. The tests also have included regularly only varieties that could be secured directly from experiment stations or from seed companies that produce their own seed and maintain the services of a well trained plant breeder. There are a number of varieties and strains of cotton yet untested in Missouri that would likely give good results. These will be tested in the future. Our past work has been confined principally to comparing the varieties listed in Table 1, for we have reason to believe that this group contains some of the best varieties available for the Southeast Missouri lowlands.

LOCATION OF TESTS

The soils of the Southeast Missouri lowlands, although of alluvial origin, show extreme variation in physical properties and productivity. Difficulty was experienced in locating a piece of land containing 3 to 5 acres of soil sufficiently uniform for experimental purposes. Regions of
soil that are dominantly sandy show many areas of heavy soils irregular in size and shape, while in the prevailing heavy soils, sand spots and streaks varying greatly in size and fertility occur.

Within the lowland area the soil types which have been mapped and described by the Soil Survey include regions of soils that are dominantly alike in texture and productivity, but many soil variations occur within these regions. Tests were conducted only on a representative area of a region and hence the results may or may not be applicable to variations occurring within it. Figure 1 is an outline map of the regions. The boundary lines are drawn to correspond to those established by the Soil Survey. However, Region 3 includes two different soil types which for the present purpose can be treated as one type.

**Region 1**, composed mostly of Sharkey clay loam, constitutes the Little River drainage district, an area of heavy soils extending from Cape Girardeau to the Arkansas line, and the heavy soils located in the eastern part of Scott, Mississippi and New Madrid counties. It is rich in plant food and where thoroughly drained is very productive. In favorable seasons yields of 1500 to 2000 pounds of seed cotton per acre are not uncommon on these soils. But on new cultivated land the plants usually produce a rank vegetative growth at the expense of early fruiting and as a result part of the crop is sometimes damaged by frost before it matures. After the land is cultivated five to ten years the tendency of the plants toward rank growth and delayed maturity partly disappears, due supposedly to the lowering of the abundant supply of organic matter. No doubt that part of Region 1 lying in Pemiscot and Dunklin counties and the western part of New Madrid county is one of the greatest potential cotton growing sections in the lowlands.

**Region 2** is composed of sandy soils. It includes a large area of Sarpy fine sand located in Mississippi, Scott and New Madrid counties, and the Lintonia fine sand in Dunklin and Stoddard counties. Extensive areas of the Sarpy sand especially in Scott county and also the Lintonia fine sand in Dunklin and Stoddard counties lying to the north of Kennett are low in plant food and subject to drifting or blowing due to a low organic matter content. This phase of the Sarpy and Lintonia soils should be used to much greater extent than at present for producing cowpeas, soybeans, rye as a cover and pasture crop, and truck crops. The better phase of the Lintonia and Sarpy soils is well adapted to cotton production. It carries only a moderate amount of plant food, but is well drained, easily cultivated, and crop failures rarely occur.

Even on the better phase of these sandy soils there is a rapidly growing need for more legume and cover crops.
Region 3 is composed entirely of soils of the Sarpy series, mostly Sarpy fine sandy loam, but also including areas of sand, loam, silt loam, silty clay loam, and clay. The soils are high in plant food, well drained, and have a deep porous subsoil that permits root development to great depth. A wide range of crops including alfalfa, clovers, corn, small grains and truck crops is adapted to this region, and it is unsurpassed in Missouri for the production of cotton.

Region 4 is occupied by Lintonia fine sandy loam and forms the Sikeston Ridge. It is similar to Region 3 in that it is adapted to a wide range of crops. Its initial plant food supply was lower than that of the soils of Region 3 and it is much older agriculturally. It is therefore less productive than Region 3, but its excellent physical properties, perfect drainage and wide adaptation of crops combine to make it a highly desirable farming area. Cotton can be grown profitably but has been grown too extensively during the past two or three years. The land should be devoted to a rotation of corn, small grains, legumes and cotton instead of continuous cotton.

METHOD OF MAKING THE TEST

The tests were conducted by the College of Agriculture in cooperation with farmers. A representative of the College has supervised the planting, chopping (thinning), and harvesting of the test plots. Seedbed preparation and cultivation was left entirely to the farmers who nearly always have handled the work quite satisfactorily.

The tests were made in two or four row plots, repeated three or four times. The length of the plots used in the different tests has varied widely but rather long plots—300 feet or more—have generally been used, for it was found in the beginning of the work that more uniform results could be secured from long plots than from short plots.

All of the tests were first planted between the 25th of April and the 10th of May at the rate of approximately 40 pounds of seed per acre. Very little replanting has been necessary except in 1923 when most of the seed rotted during a period of cold rainy weather that occurred during the second week in May.

The plants were thinned to a distance of about 12 inches apart in the row as soon as they reached the stage where there was little danger of a loss of the stand from "damping off" or from sand storms.

EXPERIMENTAL RESULTS

The acre yield of lint and money value per acre for each variety on the various regions is recorded in Table 1. The money value of lint was calculated on the basis of the past three years' average price of different staples, middling grade, as quoted by the Memphis market for the first
week of November. The three-year average price as quoted for the various staples is as follows:

<table>
<thead>
<tr>
<th>Staple</th>
<th>1 1/16</th>
<th>$1.78</th>
<th>1 3/16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middling short</td>
<td>18.50</td>
<td>19.58</td>
<td>21.08</td>
</tr>
<tr>
<td></td>
<td>15/16</td>
<td>23.25</td>
<td></td>
</tr>
</tbody>
</table>

It must be thoroughly understood that the premium on staple cotton can be secured only by growing pure varieties or strains that produce a long staple and by selling the product on a staple market. Staple cotton if sold in the seed or "dumped" on the local market in small lots seldom commands any premium over short or mixed staples.

**Table 1.—Acre Yields of Lint and Money for Different Cotton Varieties on the Various Soil Regions of the Southeast Missouri Lowlands.**

<table>
<thead>
<tr>
<th>Variety</th>
<th>Region 1</th>
<th>Region 2</th>
<th>Region 3</th>
<th>Region 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lbs. lint</td>
<td>dollars</td>
<td>lbs. lint</td>
<td>dollars</td>
</tr>
<tr>
<td>Acala</td>
<td>475</td>
<td>100.1</td>
<td>324</td>
<td>68.2</td>
</tr>
<tr>
<td>Cleveland-Wannamaker</td>
<td>394</td>
<td>72.8</td>
<td>352</td>
<td>65.1</td>
</tr>
<tr>
<td>Delfos</td>
<td>480</td>
<td>116.6</td>
<td>302.5</td>
<td>70.3</td>
</tr>
<tr>
<td>Express</td>
<td>439</td>
<td>102.0</td>
<td>319</td>
<td>73.9</td>
</tr>
<tr>
<td>Trice</td>
<td>424</td>
<td>78.4</td>
<td>281</td>
<td>51.9</td>
</tr>
</tbody>
</table>

A graphic representation of the acre value of lint produced by the different varieties in each region is shown in Figure 2. It would seem that these results should tend to discourage the production of short or mixed staples and also the careless methods of handling and marketing cotton which have been far too prevalent in Missouri in the past.

**Delfos.**—In Table 1 it will be noted that Delfos was superior to all varieties both in yield of lint and money value per acre on Regions 1 and 3. Due to its superior lint, earliness, prolific fruiting, dwarfness, open habit of growth, and small leaves, the variety is especially well adapted to the rich soils of these regions. Delfos is also suitable for growing on the better phases of the soils in Regions 2 and 4, but lacks the vigor of plant growth required on the poorer phases of Regions 1 and 2.

In regions 2 and 4 Express and Acala respectively led in money value per acre. But there was not a wide difference between the values of Delfos, Express, and Acala on each of the regions. In this connection, however, it should be emphasized further that Delfos is not adapted to the poorer soils of Region 3.

**Express** shows a wide range of adaptation to different soil conditions. It is early enough for the rich heavy soils and meets the requirements for a vigorous growing variety on the sandy soils. This variety, however,
COTTON VARIETIES FOR SOUTHEAST MISSOURI

Fig. 2.—A graphic representation of the acre value of lint of five cotton varieties on different soil regions of the Southeast Missouri lowlands.

**Region 1—Heavy Soils Rich in Plant Food**

- EXPRESS
- DELFOS
- ACALÁ
- CLEVELAND WANNAMAKER
- TRICE

**Region 2—Sandy Soils Moderate to Low Fertility**

- DELFOS
- EXPRESS
- ACALÁ
- CLEVELAND WANNAMAKER
- TRICE

**Region 3—Medium to Heavy Soils Rich in Plant Food**

- ACALÁ
- EXPRESS
- DELFOS
- CLEVELAND WANNAMAKER
- TRICE

**Region 4—Fine Sandy Loams of Moderate Fertility**

- DELFOS
- EXPRESS
- ACALÁ
- CLEVELAND WANNAMAKER
- TRICE
is commonly discriminated against, and probably justly so, on the ground that it is difficult to pick.

Acala is well adapted to medium textured soils of moderate fertility such as predominate in Regions 2 and 4, and it is especially adapted to the poorer phases of sandy soil found in Region 2. Due to its tendency toward late maturity and to the production of an excessive vegetative growth on rich heavy soils, the use of Acala should be very limited in Regions 1 and 3. Although it has, in one instance, outyielded all other varieties in a test conducted on rich heavy soil, its average yield under such soil conditions is below that of Express and Delfos in terms of money value per acre. Acala has a number of desirable characteristics which would be expected to increase its popularity in regions where it is adapted. It produces an excellent quality of lint of sufficient length to command a good premium on a staple market. The bolls are medium large, 60 to 70 to the pound. Acala is easily picked but also surpasses the other four varieties in ability to hold its cotton in stormy weather.

Trice and Wannamaker-Cleveland, both of which produce short staples, are inferior to the long-staple varieties when compared on the basis of money value of lint per acre. But the value of Trice as a variety is unduly minimized in experiments of this kind, since we have not taken into account the fact that it matures its crop earlier than most of the other varieties and is therefore less subject to frost damage, and can usually be picked before the cold fall rains begin. Also on the basis of two years’ results obtained in Region 1, which are not shown in this bulletin, there is an indication that Mississippi Station Trice is superior to the strain which has been regularly included in the tests. So far nothing better than a good strain of Trice has been found for the farmer who wishes to grow short-staple cotton on the rich soils.

Wannamaker-Cleveland ranked first in yield of lint per acre on the sandy soils of Region 2, but ranked fourth in money value. Among the short staple varieties it is probably one of the best obtainable for the sandy soils of medium to low fertility in Region 2. Cleveland has in a few instances given good results on the more fertile soils of the Southeast Missouri lowland, but its tendency toward rank growth and lateness of maturity make it very unsafe under such conditions.