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COTTON CULTURE IN OKLAHOMA.

G. E. MORROW. M. A.
Director and Agriculturist.

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OKLAHOMA

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AGRICULTURAL EXPERIMENT STATION.

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COTTON CULTURE IN OKLAHOMA.

By G. E. MORROW, Director,

SUMMARY.

Oklahoma lies to the north of the great cotton-growing regions of our country. Very little is grown north of its north boundary.

Experience has shown that cotton may be successfully grown, in favorable seasons, over a large part of the territory, but it is not probable it will become a leading crop in the northern third. Southern and, generally, southeastern Oklahoma will be found best adapted to this crop.

Especially for the more northern parts it is important to select early ripening varieties. The relatively low growing, "short limbed" varieties are believed desirable. Texas Storm Proof has been reported to the experiment station by the largest number of farmers as the variety preferred. The chief advantage of this variety is that the bolls hold the cotton more firmly than in the case of many varieties, so there is less loss from storms.

Creek or river bottom land is given the preference over uplands; timber land is usually preferred to upland prairie. A moderately sandy land seems most desirable.

Deep plowing, if possible some time before planting season, and getting the land clean and finely pulverized, are advised except in case of sandy soils.

Planting should be done as soon as it is believed danger from frosts has passed. From April 1 to May 1, covers the usual planting season in the territory. Generally the land is slightly ridged for the rows, but some have had equal success planting on the level surface. Shallow planting is advised, unless the ground is quite dry and warm.

The rows are usually from three feet six inches to four feet apart. The plants are thinned to rate of one to each 12 to 24 inches. This thinning should be done early. Much more seed is planted than would be necessary if all grew. For upland the rows and the stalks may be closer together than on bottom soil.

Thinning or "chopping out" is done with the hoe. A variety of implements is used in after-culture. Keeping the land clean with a loose surface is the main point. Shallow cultiva-

tion, especially after the stalks have made a fair growth, is better than deep.

Picking usually begins about September 1. Three pickings are commonly made.

Yields of a bale, of 500 pounds, or more per acre are reported, but a half bale per acre is, probably, a full average.

The seed has a considerable value. In some places it is taken as full pay for ginning.

Prices for cotton have been lower for some years past than formerly. The relatively fair price for the 1896 crop may cause a large increase in acreage.

Ten to fifteen acres is recommended as the largest acreage to be planted by farmers who have not had experience with the crop. This is especially recommended for those who have to rely on hired labor for picking.

COTTON IN OKLAHOMA.

Cotton has become a relatively important field crop over much of Oklahoma. There is every evidence that there will be a large increase in the acreage planted in 1897 over that for any former year. Concerning no crop has this station received so many inquiries. This bulletin gives information collected from various sources, including reports of the experience of a considerable number of farmers in the territory who have grown cotton from one to six years. Parties desiring to make an extended study of matters pertaining to cotton culture are advised to send for Bulletin No. 33, U. S. Department of Agriculture, Office of Experiment Stations, Washington, D. C. This is a work of 434 pages, entitled "The Cotton Plant: Its History, Botany, Chemistry, Culture, Enemies and Uses." The price fixed is 35 cents per copy.

Many of the more general statements in this bulletin have been compiled from this valuable publication.

THE COTTON CROP OF THE UNITED STATES.

For a number of years past the cotton crop of the United States has annually occupied 20,000,000 or more acres and from 7,000,000 to near 9,500,000 bales have been produced each year. Fifteen states and Oklahoma and Indian territories produce cotton, but in eight of these the crop is unimportant as compared with that in the others. The acreage in cotton in 1895 in Kansas, Kentucky, Missouri, Oklahoma, Utah and Virginia was less than 120,000. Texas is by far the chief cotton-growing state. Each year from 1891 to 1895 it produced from one-fourth to almost one-third of the total. Texas, Georgia and Mississippi produce more than half

of the total crop of the country. Adding to these Alabama, Arkansas, South Carolina, Louisiana and North Carolina and we have the area in which more than 95 per cent. of the total crop is grown. Unless 1896, official estimates of which crop have not been made public, was an exception, not one per cent. of the total crop has been produced in all the remainder of the U. S., excluding Tennessee.

U. S. COTTON CROP, 1895.

STATES.	ACRES.	BALES.	BALES PER ACRE.
Texas.....	5,826,428.	1,905,337.	.33
Georgia.....	3,069,323.	1,067,377.	.35
Mississippi.....	2,487,119.	1,013,358.	.41
Alabama.....	2,371,726.	663,916.	.28
South Carolina.....	1,814,728.	764,700.	.42
Arkansas.....	1,186,685.	520,660.	.44
Louisiana.....	1,142,568.	513,843.	.45
North Carolina.....	1,050,183.	397,752.	.38
Tennessee.....	712,763.	172,560.	.24
Indian Territory.....	212,847.	68,668.	.32
Florida.....	191,540.	38,722.	.20
Missouri.....	47,772.	11,816.	.25
Virginia.....	44,623.	7,964.	.18
Oklahoma.....	26,093.	14,103.	.54
Utah.....	400.	103.	.26
Kansas.....	40.	15.	.38
Total.	20,184,808.	9,161,094.	.35

The table gives the estimates for the crop of 1895 made by the U. S. Department of Agriculture. These are to be considered as estimates only. No claim is made that the figures are absolutely correct. It is probable the figures for Oklahoma and Indian Territory are less accurate than those for the chief cotton-growing states. The facts concerning the crop for any one year may be materially different from those for the succeeding year. Thus the number of bales produced in Texas in 1895 was not quite two-thirds as many as in 1894.

In one respect the table makes a most favorable showing for Oklahoma—the crop per acre was reported larger than that in any state. In 1894 only two states surpassed it in this respect.

Reports of the yields of lint cotton per acre in nine of the chief cotton-growing states for 17 different years give an average of 133 pounds. The highest average was 249 pounds in Louisiana.

The largest yield for any one state was 383 pounds in Texas in 1894.

Examination of the detailed reports of the cotton crop of 1889 made for the U. S. Census of 1890 shows that what little cotton was produced in Kansas, Missouri, Kentucky and Virginia was almost exclusively grown in the southern counties, and that no county near the north of either Arkansas, Tennessee or North Carolina had a large acreage.

The northern limit of cotton growing in the United States may be said to be 37 degrees the southern limit may be placed at 27 deg., No. Lat. The percentage of the total crop produced north of 35 deg. 30 min., is very small.

TWO CAUTIONS TO OKLAHOMA FARMERS.

The facts stated above have an important bearing on the probabilities of profitable cotton culture in Oklahoma. If the experience of the past in other parts of the country be taken as a guide, Oklahoma extends to the extreme northern limit of the cotton belt, and the northern half of the territory is north of the limit of extensive cultivation of this crop. Obviously a considerable part of western Oklahoma will not be found suited for cotton culture. No one can fix an exact line and say that north of this, cotton may not be successfully grown. In favorable seasons, or if the price of cotton were sufficiently high to make it safe to take the risk of comparative failure occasionally, it might be wise to grow much cotton in Kansas or Missouri. But there is no reason to believe that more than a narrow margin of profit is to be expected from this crop for some years to come.

One other caution may be needed by some. Cotton-growing is a business to be learned as are other businesses. It is not wise for one who has had no experience with the crop to plant largely, if the management is to be personal. Especially if chief reliance must be on hired labor for the cotton-picking, the writer would not advise the beginner to plant more than 15 acres, and 10 acres would be a safer limit in many cases.

The following paragraph by Mr. Harry Hammond, an extensive cotton-grower in South Carolina, refers to the great cotton-growing regions, but has much of suggestiveness to Oklahoma farmers:

The general testimony is that, while farmers growing cotton exclusively are in very bad condition financially, those who raise food and forage, and especially those who in addition raise their

work animals, are everywhere prosperous. The exclusive cotton-grower fails to employ the most important forces in farm work—the work animals and the land—to the fullest extent. He draws upon the surplus of a single crop made in part of the year for the means to support his farm during the whole year. There is a saving in using unemployed time and capital to produce necessaries which otherwise must be paid for in money. The tendency to pay greater attention to food and forage crops has been much accelerated by the low price of cotton since 1890.

CLIMATE.

For its best development, the cotton plant needs a growing season of at least six months; a quite warm temperature without sudden changes; a larger rainfall than can certainly be counted on in Oklahoma and this coming in frequent, moderate showers rather than in a few heavy rainfalls. Extremes of either wet or dry weather are injurious. Moderately cool weather in the later part of the season, provided there is no frost, is sometimes a benefit.

Planting should not be done until danger of frost is past, and the surface soil is reasonably warm. Especially with the late maturing varieties, picking may be continued until early winter if ripening is not checked by frost.

The date for planting named by Oklahoma farmers who kindly answered questions sent from this station, varied from April 1 to May 5. The greatest number named from April 10 to 20. Several reported simply "as early as is safe," or "as soon as the ground is warm." It is worthy of note that May 5, was named by a farmer near Oklahoma City, while April 15, was named by parties considerably further north.

These farmers named from August 15 to September 15, as average date of first picking; the larger number naming September 1. Nearly all report the practice of making three pickings.

SOILS.

Cotton is grown on a great variety of soils. Without exception the Oklahoma farmers reporting to this station give the preference to the creek or river bottom lands, although some place upland "black-jack" land nearly equal to the bottom lands. Upland prairie land is given the lowest rank except sandy timber land.

With very fertile bottom land and a favorable season the plants sometimes make an excessive growth, are more subject to disease and produce less lint than where there is a more moderate growth. A moderately sandy land may be considered the best.

Where the nature of the subsoil permits them to do so, cotton roots will go down into the soil two or three feet. In some

soils with hardpan subsoil the roots can only extend downwards a few inches and then must grow horizontally. Other things equal the deeper the soil the better.

PREPARATION OF THE SOIL.

Marked differences in methods of soil preparation for the cotton crop are found in different sections. There is good reason to believe that in some parts, the customs still pursued were first adopted because of the abundance, low priced and unintelligent labor formerly employed. For the very finely divided and compact soils common in most parts of Oklahoma, it seems certain that deep plowing—probably subsoiling—would be advisable. This is better done in late fall, or early spring. In parts of Texas it is a common practice, in fitting a field in which cotton had been grown the previous year, to simply throw two furrows together between each pair of rows, and, later, “break out” the old cotton row with a sweep, some claiming to have better results when this course is followed than where the land is first plowed. The stalks may be plowed under but, if large, it is better to have them broken off or still better, cut with a stalk cutter.

Over the larger part of the cotton belt it is customary to have a slight elevation of the land where the row is to be, two or three inches above the centers being recommended. On the other hand a few intelligent Oklahoma cotton growers report that they find a level surface and level culture quite as good, if not better.

In even greater degree than with several other cultivated crops it is important to keep the land clean, free from weeds and grass while the cotton plants are small; so that it is advisable to harrow, disk or otherwise cultivate the surface before planting, if the plowing has been done sometime previously.

PLANTING AND AFTER-CULTURE.

The great mass of the cotton of the country is grown in rows about four feet apart. There is much difference in opinion as to best distance between the plants in the rows. Distance between rows and between the plants may well be modified according to the soil and the variety grown. In general there should be a larger number of plants on thin upland soil than on rich or highly manured lands, and a larger number where the variety is low growing than with the rank, tall growing kinds.

The station's Oklahoma correspondents named from 10 to 36 inches but the large majority gave 16 to 24 inches as extremes.

When over 18 inches was named it was generally with reference to bottom lands. The greater the distance, the larger the individual plants and the yield by each. Some favor planting in check rows. Experiments have shown no injury from having two or even three stalks in a hill. This would be an advantage where it was preferred to cultivate both ways, and the cost of cultivation would be decreased if this could be done. It is not certain whether this plan would be advisable generally.

Relatively thick planting seems to hasten the maturity of the plant, which is an important point for northern regions. For upland in northern Oklahoma it is believed to be safe to plant in rows not more than 42 inches apart, and aim to have the plants 12 inches apart in the row, if early maturing, "short limbed" varieties are planted.

Whatever the distance preferred it is every way better to have as nearly a uniform stand as can be secured. The writer has noticed a good many fields of cotton in the territory in which, in any row, one might see several stalks perhaps eight inches apart and then a space from three to six feet without any.

In many cases not nearly all the seed planted germinates, so that it is necessary to plant many more than it is expected to have stalks

Less hand hoeing is necessary in Oklahoma than in regions where there is more rain. "Chopping out" or thinning to desired stand must be done with the hoe. A great variety of horse tools are used. Much more cotton is now cultivated with two horse implements than was formerly the case. Several Oklahoma correspondents say "hoe and any good corn cultivator." Deep cultivation while the plants are small may be advisable but shallow culture later is clearly better in most cases. Many trials have shown that a large part of the lateral roots are sufficiently near the surface to be injured or destroyed by deep cultivation even near the middle of the row. The rule that applies to corn would seem a safe one in cotton culture: That method and those implements which will keep the soil free from grass and weeds, the surface loose and well pulverized, with the least injury to the roots and with least labor and cost to the farmer is best. If one prefers a disk cultivator, another a spring tooth cultivator, another a cultivator with several small teeth, another the good, old fashioned "sweeps," and still another thinks he can do most of the work to best advantage with a hoe—each may raise equally good crops, but there would be a good

deal of difference in the cost, possibly. Picking is the most tiresome, troublesome and costly part of the work. Several cotton picking machines have been tested but none have come into general use. Probably in no part of farm work is there greater gain from knowing how to work to the best advantage. There are great differences in the amount of work done by different persons who work equally faithfully. In many cases boys and girls can pick more than men and women. Payment is most commonly made by the quantity picked rather than by the time taken, but there is a good deal of difference in the thoroughness of the work done by different persons. The opinion held by many that negroes can pick more than can whites has been abundantly disproved.

VARIETIES, SELECTION OF SEED, IMPROVEMENT.

There is a large number of more or less distinct varieties of cotton. A much larger number of names have been applied to claimed distinct varieties, many of which are practically or exactly alike. In Farmers' Bulletin No. 33, before referred to, Prof. Tracy gives a list of more than 200 names applied to American varieties of cotton. Some of these are tall growing, long limbed; others low growing with short limbs; some have the bolls in clusters. They differ much in length of fiber and in proportion of seed to fiber. There is much difference in productiveness. In a noticeable degree plants of the same variety vary. This makes the work of selection of seed more important and the work of improving and adapting a variety to a given locality the more easy.

Prof. Tracy recommends that only early ripening varieties be selected for planting north of 32 degrees. Little of Oklahoma lies south of 35 degrees. In a letter to the writer, Director Bennett, of the Arkansas station, recommends the short limbed, early ripening varieties for Oklahoma.

Oklahoma correspondents most frequently mention Storm Proof or Texas Storm Proof as the variety preferred. Next to this Ounce Boll and Petican are most frequently named. Cheatem Prolific and Moon are also named. A considerable number either do not name any variety or state that they do not know. Neither the Ounce Boll nor the Petican is described by Prof. Tracy. Possibly the latter name is a corruption of Peterkin.

The Storm Proof gets its name and good reputation from the fact that the cotton does not drop so readily from the boll in time of rain or wind as in case of many varieties. Prof. Tracy classes this, however, among the late ripening varieties and as not very

prolific. Among the early ripening varieties he names: Cherry Cluster, Dickson, Drake Cluster, Hawkins, Hunnicutt, King, Peerless and Peterkin. Nearly all these have a short staple and a good percentage of lint.

Much can be done by individual cotton growers to improve the adaptation of the kind used to their soil and climate. A cotton grower, W. A. Cook, says:

“I can take any of the so called distinct varieties of cotton and in a few years develop all the know varieties from it.——All that is necessary is to watch the field from year to year, and when a ‘sport’ is noticed, save the seeds and plant them by themselves.”

The Mississippi station says the variety depends more on the care with which the seed has been selected during the last two or three years than upon its original source, and without constant care in the selection of seed, any variety will soon “run out.”

For much of Oklahoma early maturing is a most important point and saving seed from plants from which picking can first be done is advisable. Looking to the earliness and the yield of cotton is better than selecting because of great vigor or size of the plant. In many cases, the most vigorous plants give small yields of cotton.

As with other plants and with farm animals, it is impossible to combine all desirable qualities in the highest degree in any one variety. It is doubtful if any variety producing a remarkably long staple should be selected unless for southern Oklahoma.

Prof. Tracy, Director of the Mississippi station, thinks the “cluster” varieties are better suited for the middle and southern cotton regions than for more northern latitudes. The short limbed varieties are better than the long limbed in the northern region.

Different varieties differ considerably in the percentage of lint to the total weight of the “seed cotton.” Some varieties have less than 30 while others have 35 per cent of lint. One or two Oklahoma farmers have insisted that mixing varieties in planting is an advantage, but the large majority do not agree with this.

VALUE OF THE SEED.

The profitableness of cotton growing will depend largely on the use that is made of the seed. This will depend, in large degree, on the location. If distant from a railroad or a cotton seed oil mill, the cost of transportation may be so great as to make shipment unprofitable. The seed has a considerable feeding value. It is not a good food for hogs and young stock of any kind

often do not do so well when fed it as do older animals. Boiling or steaming the seed makes it more valuable, but frequently the cost of the work is more than the increase in value of the food. The seeds contain an excessive quantity of oil; hence are a better fattening food than for securing growth. A moderate quantity fed where the chief food is hay, straw or corn stalks would improve the ration. Feeding some grain with the cotton seed is advisable rather than feeding the latter alone.

The station's Oklahoma correspondents differ much in their estimates of the value of the whole seed for feeding, as also concerning price received when sold. The latter varied from \$6 to \$8 per ton and from 9 to 15 cents per bushel. Several give the feeding value at same figure as the selling value; a few put the feeding value higher than selling price, while others make it considerably lower. Some report—"valuable when mixed with corn;" "good for cows," etc.

The value of cotton seed cake or meal has been proved. With the prices obtainable for corn in Oklahoma when the crop is a fair one, it is not probable, however, that large quantities of this will be fed in the territory, for a few years. In many cases the feeding of moderate quantities in connection with corn for fattening animals would be advisable.

Cotton seed hulls have a fair value as food for stock. Farmers near oil mills may often find it profitable to purchase the hulls, but the usual abundance of prairie hay, corn or Kaffir fodder, straw, etc., will tend to prevent much shipment of hulls within the territory.

YIELDS AND COST.

The estimates as to average yields per acre in Oklahoma and of the cost of cultivation, etc., which were sent this station, differ much. Some correspondents apparently reported for seed cotton; others for lint. The average was about 260 lb. lint cotton per acre.

The cost of ginning was reported at from \$2.50 to \$3.75 per bale of 500 pounds. In some cases the ginning was done for the seed; in others for the seed and \$1 per bale.

The estimates as to cost per acre, not counting rent of land varied from \$2 to \$10. Probably a part of this wide difference is explained by the supposition that some included the cost of ginning while others included only labor.

If the grower have a sufficient force of laborers in his own family cotton, up to the work of ginning, is almost entirely a labor

rather than a money crop. If the seed is taken as equivalent for ginning, the grower may have his crop ready for cash sale with very little direct payment of money.

For some years past prices for cotton have been low. There is little reason to anticipate any marked advance, unless there should be partial failure.

NOTES BY OKLAHOMA COTTON GROWERS.

Cleveland County.

G. W. Everett—"Seven years' experience. My advice to all farmers is to diversify their crops, but I believe cotton is our chief resource in Southern Oklahoma."

L. P. Barker,—“Six years' experience. Cotton should be kept perfectly clean when young, or the web worm will breed in the young weeds and destroy the cotton. Do not cover seed over one inch deep.”

J. Vandarvere—"Seven years' experience. Plant shallow. Select good seed. Have land well pulverized. Keep clean. Pick soon after opening. Break land early. Make ridges, and drag off in front of planter.”

Oklahoma County.

H. Montgomery,—“Seven years' experience. The secret of cotton growing is to get the cotton to one stalk in the row as early as possible, and not allow foreign vegetation to hinder its growth. Planting on flat surface I find the best. Sandy land should be left rough.”

J. C. Shackelford,—“Five years' experience. Cotton is the best paying crop for this country. I would advise all farmers to plant all they can tend.”

A. J. Henthorn,—“Five years' experience. Plant on level. One half bushel seed to a acre. Plow with 12 inch. sweep as soon as the plants have four leaves, and chop to a stand when they have six leaves. Cultivate shallow, level and as often as it rains. Do not ridge it up unless it is a wet season.”

Lincoln County.

C. P. Buck,—“Three years' experience. I would advise every

farmer to raise some cotton, but they should raise enough corn to feed."

E. A. Johnston,—“Four years' experience. My experience it that cotton does best on sandy land. Most of our cotton seed is mixed.”

I. J. Chambers,—“I have been raising cotton for 30 years; have grown it here for three years. In 1895 I had a bale to the acre; in 1896 one-half a bale—on river bottom.”

Blaine County.

J. E. Thompson,—“Two years' experience. It has been too dry here for the last two years to make much of anything, although cotton more than tripled anything else we planted. I know this county is better for cotton than anything else—that is the south and east. I never saw cotton do better than here when we have rains.”

J. L. McKinsey,—“I think cotton is a great crop to stand the drouth. It is sure money. It leaves the land in good shape. Plow land deep and prepare it fine. Cultivate after rain. Keep surface loose and clean.”

C. F. Mercer,—“Any good sand loam is good for cotton. Black dirt is “no good.” Timber land is better, other things being equal.”

D. W. Armstrong,—“From my observation in 1896 I am of opinion that a profitable mode of cultivation would be to plant in checks, two and one half or three by four feet. I have noted that isolated stalks fruit heavily.

