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Oats

Oklahoma Agricultural Experiment Station,

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FIELD CROPS, 1899.*

SUMMARY.

1. *With oats*, early seeding of an early-maturing variety has given best results.

2. *With Kafir corn*, planting about the middle of May in rows three feet apart with one stalk each three to five inches has generally given the highest yields, though in 1899, planting in early April proved best.

3. *With corn*, no definite differences in yield were produced by variations in thickness of planting or in methods of plowing and cultivation.

4. *With castor beans*, no difference in yield was obtained from planting weekly from March 21st to April 26th. Planting May 16th gave the lowest yield. Manuring more than doubled the yield.

5. *With cotton*, tests of time and thickness of planting gave no conclusive results. Planting from April 15th to May 15th in rows three to three and one-half feet apart, and chopping to one stalk to each eighteen inches, is the general practice of cotton growers in eastern central Oklahoma.

THE CROP SEASON OF 1899.

The spring months were quite favorable for plant growth, and so were the summer months up to August. During this month the rainfall was below the average of the same month for the preceding four years. And in addition, the temperature was extraordinarily high, and for a few days there was an approximation to hot winds. September was an exceedingly dry month, and only .88 of an inch of rain fell. The rainfall for the year was a little below the average for the three preceding years, and aside from the above exception, was fairly well distributed.

* These experiments were planned and begun by G. E. Morrow and J. H. Bone. The work was taken up July 1st; completed, and summarized by F. C. Burtis.

OATS.

The season was fairly favorable for oats. The crop may be considered a good average. Rust was not abundant, and the grain was of a very good quality. The only experiment carried on was one with varieties. The plats were situated on a medium heavy soil. A test was made of five varieties that had given promising results in previous experiments. Large plats, 376 by 38 feet, were used, devoting one plat to a variety, except in the case of Texas Red.

TABLE I—Oat Varieties.

Plat No.	VARIETY.	Per cent. of Smut Heads	Yield Per Acre.	
			Grain Bushels	Straw Tons
120	Texas Red	.04	34.5	1.36
121	Lincoln	.77	41.0	1.28
122	Mixed	16.20	32.0	1.26
123	Black Russian	16.25	32.0	1.22
124	Negro Wonder	1.56	35.2	95
125	Texas Red	.04	43.9	1.23

The plats were all seeded March 30th and harvested July 6th. The seeding was done at the rate of three bushels per acre.

Early seeding and the selection of an early maturing variety are the important points to be observed in oat growing in this country.

KAFIR CORN.

The past season has not been as favorable to the full development of this crop as usual. During the months of seeding, the conditions were more favorable than usual and seed planted weekly from April 4th till the middle of June germinated well. The cold, wet storm that generally comes in April or early May, that is sure to rot newly planted Kafir corn, did not appear. But this year the Kafir crop was cut short by a light rainfall and dry winds in August, and an exceedingly dry September that gave the Kafir no chance to recover.

The following experiments were carried on; in all cases the black-hulled white variety was used. At the station, fifty-six pounds of grain is considered one bushel.

THICKNESS OF PLANTING.

As planned, this experiment consisted of a large number of single plats on which there was to be a wide variation in the distance between hills in the row, and in the number of plants in the hill; but due to the poor and irregular stand in many cases,

the original plan was abandoned, and the single row plats that joined each other were grouped into one plat. As a result, the experiment consists of a smaller number of larger plats varying somewhat in size, with a thick planting of Kafir corn on some, a medium stand on others, and a very thin stand on others. The results must be, more or less, of a general nature, as the stand varies somewhat on each plat. The approximate stand was obtained by counting the number of stalks in fifty feet of row in numerous places on each plat. The results are given in table two.

TABLE II—Thickness of Planting Kafir Corn.

Plat No.	Rows Feet Apart.	Inches between Stalks	Yield per Acre.	
			Grain, bushels	Stover, tons.
11	Three feet	2.6	51.0	2.81
4	Two and one half feet	5.3	49.0	3.36
8	Three feet	6.0	40.0	2.25
3	Two and one half feet	2.1	39.8	.47
1	Two and one half feet	1.7	37.9	2.93
14	Four feet	1.7	35.0	2.71
9	Three and one half feet	1.8	31.0	3.15
6	Two and one half feet	10.7	29.0	1.13
2	Two and one half feet	7.6	26.4	1.41
13	Three feet	11.3	22.6	1.38
10	Three feet	8.6	20.4	1.59
7	Three feet	13.6	15.5	.99
12	Three feet	18.1	10.5	1.05
5	Two and one half feet	17.1	8.6	.47

The largest yield of grain, fifty-one bushels per acre, was obtained on plat eleven where the rows were three and one-half feet apart, and the stalks averaging two and six-tenths inches apart in the row. Distances varying considerably above and below this distance gave good results, but when the stalks were ten to eighteen inches apart in the row, very low yields were obtained. Having the rows close together did not bring up the yield. Where the stalks were ten to eighteen inches apart, they were short and coarse. The heads were good size but not enough larger to make up for the deficiency in number. The very thin planting headed and ripened later than the thick planting, and as a rule the heads did not clear the sheath entirely, which was not the case with the thick planting.

Previous experiments at this station agree with these results very well and all go to show that Kafir corn should be planted much thicker than Indian corn; and, for the best yields of grain, the rows should be as close as can be cultivated conveniently, about three feet apart, and the stalks should be from three to five inches apart in the row. From all the experiments,

it is found that it is a much better plan to have a good thick stand rather than a very thin one. A stand that is considered too thick, if taken in time, may be readily thinned with the harrow, or with the cultivator by covering some of the plants.

TIME OF PLANTING.

The plan of this experiment was to make weekly plantings, commencing April 4th, and ending June 13th, and plantings were made on the dates as indicated in the table. Plats of 5,592 square feet each were used. The Kafir corn was drilled in rows three feet apart. At harvest time, a determination of the stand was made, and found to be as given in the table. It was somewhat irregular on each plat.

TABLE 3.—Time of planting Kafir corn.

PLAT NO.	DATE OF PLANTING.	DATE OF RIPENING	YIELD PER ACRE.	
			Grain, Bushels.	Stover, Tons
1	Apriil 4th	August 10th	43.2	2.56
2	April 11th	August 10th	34.6	2.03
3	April 19th	August 16th	34.3	2.17
4	April 26th	August 16th	30.3	1.94
5	May 16th	August 24th	22.8	2.48
6	May 23rd	August 31st	28.6	2.83
7	May 30th	September 5th	24.0	2.79
8	June 6th	September 15th	13.4	2.13
8a	June 13th	September 15th	2.8	1.35

The earliest planting, April 4th, gave decidedly the largest yield of grain; and, on each succeeding planting, with an exception or two, there was a falling off in the yield until the latest, June 13th, where it was almost a failure. The weather was fairly favorable for the filling and maturing of the grain on the early plantings, but not so on the late ones, which were filling during August, which was a month of light rainfall and more or less hot winds. And this was followed by the unusually dry month of September, which gave the Kafir corn no chance to recover, which it is capable of doing early in the season when the rain follows a drouth.

In a similar experiment at this station in 1897, plats planted on May 12 and 22 gave yields of 38.2 bushels per acre, as compared with 22.3 bushels per acre on plats planted April 17th and May 1st. In 1898 plantings on May 13th and 24th gave higher yields than plantings on April 4th, 11th, 18th, 25th, or June 3d.

DEEP AND SHALLOW CULTIVATION.

This was quite an extensively planned experiment, but wet weather prevented carrying it out fully. The plats were situ-

ated on a heavy soil underlaid with a stiff subsoil. During the period of cultivation, several heavy rains fell, and one after the crop was laid by. These leveled and run the ground together until the surface of all the plats looked alike at harvest time. Plat 61 received no cultivation except the surface was scraped with a hoe whenever the weeds started. All plats were planted on May 20th and cut and shocked on August 24th to 26th.

TABLE 4.—Kafir corn, deep and shallow cultivatien.

Plat No.	TREATMENT.	Inches between stalks (Average.)	YIELD PER ACRE	
			Grain, Bushels	Stover, Tons.
58	Shallow	1.75	26	3.12
59	Shallow	1.77	29	3.46
60	Deep	1.95	42	
61	None	1.77	37	
62	Deep and Shallow	1.82	32	3.66
63	Shallow	1.70	32	4.19
64	Shallow	1.80	34	3.95
65	Shallow	1.80	37	4.24
66	Deep	1.89	31	3.66
67	Shallow	2.10	31	3.76
68	Shallow	2.05	30	3.12

CORN.

The season of 1899 was very favorable for early planted corn, and that on the college farm went through without serious damage, as the most of it was ripe by the end of the first week in August. The variety used in the experiment is an early and rather small growing sort suitable for the uplands. It is a white corn and goes under the name of Early Adams. In most of the experiments, the plats are of good size and long and narrow. The soil is upland prairie, heavy in character. Planting was done between April 15th and 25th.

THICKNESS OF PLANTING.

The plan of this experiment is quite fully explained in the following table. The stand was not as regular as planned, but there were no great variations in it. The well-distributed rainfall during the growing season was a great aid to the thickly planted corn, and better results are given here than can be expected usually with corn planted so thickly. It was necessary to cut up the corn on the thick planting a week earlier than on the thin. Stalks were smaller and finer, but 50 per cent. of the ears were very small nubbins, while in the case of the thin plantings, only 10 to 12 per cent. were nubbins

TABLE V. Corn, Thickness of Planting.

PLAT NO.	Inches Between Hills	No. of Stalks per hill	Distance Between Rows, ft	Av. No. of Stalks in 50 ft. of row	YIELD PER ACRE	
					Grain Bushels	Stover Tons
24	44	4	3⅓	57	27	1.20
25	44	3	3⅓	35	17	1.19
26	44	2	3⅓	32	20	1.11
27	3	1	3⅓	136	14	1.47
28	6	1	3⅓	81	15	.99
29	9	1	3⅓	49	17	.75
30	12	1	3⅓	54	20	.99
31	18	1	3⅓	44	22	.75
32	22	1	3⅓	40	22	1.19
33	18	2	3⅓	48	22	1.07
34	36	4	3	60	18	1.39
35	36	3	3	46	20	1.19
36	36	2	3	40	20	.99
37	18	2	3	46	21	.99
38	9	1	3	49	18	.99
39	12	1	3	41	22	1.15
40	18	1	3	32	22	1.15
41	3	1	3	148	11	1.43
42	6	1	3	77	13	1.27
43	24	2	3	47	25	1.03

In this experiment the results differ but little, whether the corn is in hills or drills; but the largest yields of grain were obtained where there were at least twelve inches given to each stalk in the row.

DEEP AND SHALLOW PLOWING.

This experiment was situated on a heavy piece of land underlaid with a stiff subsoil. The fact must be kept in mind that the spring and early summer had an unusual rainfall. The plats were all given the same cultivation. No difference could be seen in the ground on the different treatments. On the manured ground, the growth was larger and more vigorous. As seen by the following table, the results are not at all regular.

TABLE VI. Deep and Shallow Plowing for Corn.

Plat No.	TREATMENT.	YIELD PER ACRE	
		Grain Bushels	Stover Tons
1	With riding plow 4 inches deep	30	.64
2	With riding plow 6 inches deep	32	.75
3	With riding plow 8 inches deep	39	.62
4	With riding plow 12 inches deep	48	.67
5	With riding plow 8 in. deep and subsoiled to 15 inches	32	.67
6	With disc plow 10 in. deep, furrow 6 inches deep	34	.67
7	With disc plow 12 in. deep, furrow 6 inches deep	30	.69
8	With riding plow 4 inches deep	33	.60
9	With riding plow 8 inches deep on day of planting	39	.78
10	With riding plow 8 inches deep on day of planting	32	.96
11	With disc plow 12 inches deep, furrows 6 inches deep	52	.96
12	With disc plow 10 inches deep, furrows 6 inches deep	56	1.02
13	With riding plow 8 in. deep and subsoiled to 15 inches	52	1.02
14	With riding plow 4 inches deep	50	1.25
15	With riding plow 6 inches deep	51	1.10
16	With riding plow 8 inches deep	53	1.25
17	With riding plow 12 inches deep	50	1.07

Plats 1 to 9 were not manured; 10 to 17 were manured.

On two dates, July 28th and August 9th, soil samples were taken for moisture determinations. These were taken on each plat from zero to twelve inches deep, and twelve inches to eighteen inches deep. Several samples were taken on each plat. Nothing definite can be drawn from the results but there is nothing to show that the deeply plowed plats contained any more moisture than the shallow plowed plats, at the critical period. The grain was of very fair quality on all the plats.

METHODS OF CULTIVATION.

This experiment, as carried out, was only a modification of what was planned. Plats 44, 49, 50, and 53 were cultivated with a Daisy spring-tooth cultivator; and plats 45 and 51, with the Tower cultivator; plats 46 and 52, with the double shovel cultivator; plat 47 was merely scraped with the hoe to keep down the weeds; plats 48 and 51, with both the double shovel and the spring tooth. All the plats, except 47, were cultivated first on May 18th; and at at other times, to the number given in the table.

TABLE VII Corn, Methods of Cultivation,

Plat No.	Methods of Cultivation.	No. of Times Cultivated	Yield per Acre.	
			Grain Bushels	Stover Tons
44	Shallow	3	46	1.22
45	Shallow	3	44	1.22
46	Deep	3	46	1.22
47	None	0	48	1.22
48	Deep and shallow	3	48	1.25
49	Shallow	3	48	1.25
50	Shallow	5	45	1.22
51	Shallow	5	43	1.57
52	Deep	3	43	.97
53	Shallow	1	43	1.09
54	Shallow	3	46	1.22
55	Deep and shallow	3	44	1.14

At the time when the corn was earing, it would have been difficult to have told that the plats had received any different treatment, as the rain had washed and settled the soil, and no difference could be seen in the growth on the different plats.

CASTOR BEANS.

The hot, dry weather in August affected this crop to some extent. The seed used was the so-called common castor bean and had been grown on the station farm for several years past where the best spikes had been selected for seed each year. The experiments were situated in different fields.

VARIATIONS IN TIME OF PLANTING.

This experiment was situated in a field that had received applications of barnyard manure in previous years and was in good tilth. The plat rows were three feet and eight inches apart. Plantings were made on dates as given in the following table:

TABLE VIII.—Castor Beans; time of Planting.

Plat No.	TIME OF PLANTING.	DATE OF COMING UP.	DATE OF FIRST BLOOM.	Inches Between Plants, Average.	Yield per acre Bushels.
53	March 21	April 24	June 6	21.4	7.9
54	March 30	April 25	June 10	17.6	7.6
55	April 4	April 26	June 12	18.7	8.1
56	April 11	May 1	June 15	16.7	7.5
57	April 19	May 7	June 17		7.5
58	April 26	May 14	June 20	17.6	7.4
59	May 16	May 28	June 22	18.1	4.3

There is but little difference in the yields from the different dates of planting, with the exception of the last one where the yield is about half that of the others. The fact should be noticed that the first planting was over thirty days in coming up, while the last planting was only twelve days. In effect this really makes the dates of planting the same on the first four. March was a cold backward month to what it generally is, and had its influence on the early plantings. The first picking was made on July 24th and included all of the plats; on the last two plantings, only a few of the spikes were ripe, but on the early plantings, 25 to 35 per cent. of the crops were harvested at that time. Other pickings were made on all of the plats July 31st, August 17th, 19th and 29th, and on September 13th. On all, except the last three plats, about one-third of the crop was harvested at the second picking. On all of the plats the returns were very light after the fourth picking, which was on August 17th, and the crop might as well have been plowed under if the ground was needed for other purposes. At the time of the fifth picking, there was quite a showing of new spikes in various stages of development, but most of these never fully matured. The sixth picking was to determine the value of these and showed that it did not pay to bother with them.

THICKNESS OF PLANTING.

This experiment was situated on a poor piece of thin ground where the subsoil cropped out in places. The growth of the plants was quite irregular and suffered more or less from

dry weather. Due to the poor and irregular stand obtained on many of the plats, the stand as given in the table is only an approximation of the stand as planned.

TABLE IX.—Castor Beans; Thickness of Planting.

Plat No.	Width of Rows, Feet.	Inches Between Plants, Average.	Yield per acre Buchels.
30	Three	15.3	5.9
31	Three	20.0	4.1
32	Three and one-half	25.0	3.0
33	Three and one-half	18.0	2.8
34	Three and one-half	18.0	3.3
35	Three and one-half	16.6	2.5
36	Four	17.5	2.9
37	Four	16.6	3.7
38	Four	13.9	3.6

The following table shows the yield of castor beans in an experiment where the soil was manured.

TABE X.—Castor Beans; Rotation plats.

Plat No.	Treatment.	Inches Betwen Plants Average.	Yield per acre Bushels.
4	Manured	14.6	9.6
5	Unmanured	13.4	4.3

COTTON.

The drouth of August and September had quite an effect on the cotton crop, although the crop on the Station farm did not suffer as severely as it did in some localities, as it had good, clean culture. The spring and early summer were quite favorable to the crop.

TIME OF PLANTING.

All plats in this experiment were made in duplicate, but due to an accident to those joining numbers 61 and 69, they were abandoned The experiment is situated on a field that has received barnyard manure in previous years. The rows were three feet apart. The dates of planting, dates of coming up, and dates of opening of the first bolls, etc., are given in the following table:

TABLE XI.—Cotton; Time of Planting.

Plat No.	Date of Planting.	Date up.	Date of First Bloom.	Date First Boll Open.	Average Distance Between Stalks, Inches.	Seed Cotton per Acre, Pounds.
61	April 11	May 3	July 13	August 19	15.3	1,176
62	April 19	May 8	July 13	August 19	20.0	1,462
63	April 26	May 15	July 13	August 19	18.1	910
64	May 16	May 24	July 17	August 19	27.2	627
65	April 4	May 3	July 13	August 19	18.1	1,068
66	April 11	May 3	July 13	August 19	17.1	868
67	April 19	May 8	July 13	August 19	13.6	1,047
68	April 26	May 15	July 18	August 19	15.7	1,206

It is noticeable that the difference in maturity of the different plantings diminishes from date of blooming until there is practically no difference when the bolls begin to burst. Pickings commenced on all plats September 4th and ended November 3d. The stand on the different plats is so irregular that it is difficult to draw close conclusions as to the effect of the time of the various plantings. In former experiments, the earlier plantings have given the larger yields,

THICKNESS OF PLANTING.

This experiment was situated in the same field as the castor bean experiment, where the soil is thin and poor, but the crop turned out somewhat better. The plan was to have a plat with the stalks nine inches apart in the row, one with them twelve inches apart, and one with them eighteen inches apart for each of the variations between the rows, but the table gives the stand found at harvest time, and the stand is much thinner than planned.

TABLE XII.—Cotton; Thickness of Planting.

Plat No.	WIDTH OF ROW, FEET.	Average Distance Between Stalks, Inches.	Seed Cotton per Acre, Pounds.
9	Three	24.0	837.4
10	Three	25.0	917.8
11	Three	31.5	901.7
12	Three and two-thirds	28.5	863.0
13	Three and two-thirds	28.5	773.0
14	Three and two-thirds	33.3	862.0
15	Four	35.2	958.0
16	Four	27.2	998.0
17	Four	28.5	805.0

The variations in the results may be partly assigned to the irregular stand on many of the plats. While the table shows the average distance between the stalks, it can not show the irregularity of the stand.

EXPERIENCE OF FARMERS WITH COTTON.

In the fall of 1899 an inquiry* concerning the cotton crop was conducted in parts of Noble, Lincoln, Logan and Payne counties. Eighty farmers in these counties were interviewed and the result of their experience and observation with this crop has been summarized. Ten per cent of this number regarded the growing of cotton as unprofitable, The average

* The data were collected and summarized by A. G. Adjemian.

area devoted to cotton was fifteen acres and the yields during the fall of 1899 varied from 500 to 800 lbs. of seed cotton per acre. This cotton was sold at $1.90 to $2.20 per hundred pounds with an estimated profit per acre of from $5 to $10. The yields this year were about two-thirds of what was secured in 1898, but the difference in price made the profit per acre about the same. Many farmers regard the crop as one which is desirable to provide work that the children can do, but deplore the fact that cotton picking frequently keeps the children out of school.

Sandy or sandy loam soils are given the preference and there is a strong belief in the value of manure on cotton soils. The time of planting varied from April 15 to May 15 with no traceable effect on yield from difference in time of planting. The cotton was usually chopped to one stalk each eighteen inches, with rows three to three and one-half feet apart. The average number of cultivations given was three with preference about equally divided between level and ridge culture. The advantage of thorough, shallow cultivation and clean culture was noted by many. The average number of pickings given was three.

It is the general opinion that the growing of a limited amount of cotton will prove continually profitable. This crop has it place in the great diversification of crops possible here and there seems to be no tendency toward making the great mistake of going into exclusive cotton culture.

COWPEAS FOR GRAIN.

One large plat each of the following varieties: Black Eye, Clay, and Whipoorwill, were drilled in rows three feet apart. A fair stand was obtained on all the plats, and the plants were from four to twelve inches apart in the row. The soil where the plats were situated is only of fair fertility. The Black Eye was planted on May 25th, and was up May 30th. The Clay and Whippoorwill was planted on May 30th, and were up June 4th. The growth during June and July was quite satisfactory, but no blooms appeared. The dry weather in August stopped the growth, but the plants remained green until the first of September, when the leaves commenced to turn yellow; and, as only a scattering bloom here and there had made an appearance, the plats were all cut for hay the first week in September. The

following is the yield of well cured hay per acre for each variety: Black Eye, .78 of a ton; Clay, .96 of a ton, and Whippoorwill, .78 of a ton. It is a fair yield of hay when it is considered that it was well cured, and that the crop was in rows suitable for raising grain and not thick enough for the largest yield of hay. The failure of cowpeas to produce a crop of grain, due to drouth, is not a frequent occurrence, but sometimes happens when the drouth strikes them at the critical time and is of long duration.