

OKLAHOMA
Agricultural Experiment Station.

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Department of Agriculture.

OATS.

1. Jensen Treatment for Smut.
2. Rolling the Seed-Bed.
3. Per cent. of Mixture in Contiguous Plats.
4. Broad-casting vs. Drilling.
5. Quantity of Seed to the Acre.
6. Cross Drilling.
7. Southern vs. Northern Grown Seed.
8. Acre Continuously Without Manure.
9. Sub-Soiling on Alkali Lands.
10. Test of Varieties.

BY

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OATS.

BY A. C. MAGRUDER, M. S.

The year's work done by the Department of Agriculture with oats is summed up under the following heads:

1. Jensen Treatment for Smut.
2. Rolling the Seed-Bed.
3. Per Cent. of Mixture in Contiguous Plats.
4. Broad-Casting vs. Press-Drilling.
5. Quantity of Seed to the Acre.
6. Cross Drilling.
7. Southern vs. Northern Grown Seed.
8. Acre Continuously Without Manure.
9. Sub-Soiling on Alkali Soil.
10. Test of Varieties.

EXPERIMENT NO. 47.

JENSEN OR HOT WATER TREATMENT OF OATS FOR DESTROYING SMUT.

This method was explained in Bulletin No. 4, of this Station, as follows:

"Smut is a fungous growth living upon the head of oats and may be transmitted to a crop through the seed.

"A cheap method, involving little money and time, may be employed to rid the seed of smut. It is known as the Hot Water Treatment, or 'Jensen Method,' it having been first published by Mr. Jensen of Denmark.

"The process consists in placing the seed oats in water at a temperature of 135 degrees Fah. and allowing it to remain there fifteen minutes."

DIRECTIONS FOR USING.

"1. Have the water exactly 135 degrees Fah. Do not let it be warmer or the vitality of the seed will be injured.

"2. Put the seed in a sack or basket, and let it remain in the water no less than 13 nor longer than 15 minutes.

"3. See that the water is as hot when the seed is removed as when it was put in.

"4. As soon as the seed is removed from the bath, dip it in cold water to cool, then spread out to dry.

"5. Secure a good Fahrenheit thermometer, a bushel basket or sack, and a half barrel for the hot water."

Results of the test in 1892 indicated the necessity of continuing the experiment and twelve plats of one-thirty-second of an acre each were devoted to the work with the following results:

Acre yield treated, based on an average of six plats,	19.66 bu.
Acre yield not treated, based on an average of six plats.....	18.25 "
In favor of treatment,	1.41 bu.

The above results do not show so great a difference between the treated oats and those not treated as in the previous year's work; but even this small increase in yield will account for a difference of 141 bushels on a hundred acres, and the cost will not exceed five dollars.

The method is earnestly recommended where smut abounds.

EXPERIMENT NO. 46.

ROLLING THE OAT SEED-BED.

Forty plats were used in this experiment. Ten were rolled before seeding, ten were rolled after seeding, ten were rolled both before and after seeding, and ten were left unrolled.

YIELD OF GRAIN TO THE ACRE.

Not rolled,	21.4 bu.
Rolled before seeding,	22.5 bu.
Rolled after seeding,	21.6 bu.
Rolled before and after seeding,	19.7 bu.

YIELD OF STRAW TO THE ACRE.

Not rolled,	130.6 lbs.
Rolled before seeding,	130.3 lbs.
Rolled after seeding,	124.9 lbs.
Rolled before and after seeding,	113.6 lbs.

The highest yield of grain to the acre was where the ground was rolled before seeding; the next highest yield was from rolling after seeding; the next where the seed-bed was not rolled at all, and the least yield was on soil rolled both before and after seeding.

In preparing a firm seed-bed the soil was evidently so packed by the rolling in the case of rolling both before and after seeding that capillary attraction was greatly facilitated and larger quantities of water left the soil on these plats than on the others.

The weight of a bushel was highest in the plats rolled after the drilling and lowest in the plats rolled before the drilling. We cannot believe that the mere matter of rolling the seed-bed would account for this difference.

EXPERIMENT NO. 44.

PER CENT. OF MIXTURE IN CONTIGUOUS PLATS.

This experiment was instituted for our own enlightenment. It is well known that different kinds of wheat may be planted close together without mixing, but the same is not the case with oats. Just how great the mixture is where plats are but two feet apart is what we desire to know.

To this end eleven plats were seeded alternating the White Russian oat with the Black Tartarian. A large number of counts from each variety was made after threshing to determine the per cent. of mixture, but in every plat it was apparent that the White Russian predominated, there being BUT A SLIGHT TRACE of the black oat in any of the samples. This subject is worthy of careful study and investigation, and will receive the attention due it from a scientific rather than a practical standpoint, as it is of little practical value to the farmer.

EXPERIMENT NO. 43.

BROADCASTING vs. PRESS DRILL SEEDING.

Every style of seeding has its champions who maintain that from their experience their practice is the best. Many such assertions are valueless, as they are not based on accurate weights and measurements, and again two methods of seeding are often compared when the broadcasting was one year and the drilling the next. This is no test and offers no basis for comparisons. Plats accurately laid off on soil of the same quality, plowed at the same time, harvested alike, and in fact treated similarly in every respect except one series is put in by one method and the other series by another method. This then furnishes a test of this method of seeding. Such were the conditions of the test to ascertain the value of the two methods usually employed in seeding oats.

The broadcast seed sower is a disk harrow to which is attached a seed box and arrangements for dropping the seed, which fall through a tube which terminates in a flattened side turned forward at an angle so as to half close the end of the tube. The seed drops on this flange which scatters them evenly on the ground, and the disk harrow covers the seed as ordinarily.

The results were as follows:

	Bu. to acre.	Test.
Broadcasting.....	18.1	20.6
Press drilling.....	21.25	20.5

Here is a gain of over three bushels of grain to the acre, which must be attributed solely to the manner of seeding.

EXPERIMENT NO. 45.

CROSS DRILLING

This experiment did not present sufficient data for a report. It will be reported on after other trials.

EXPERIMENT NO. 48.

QUANTITY OF SEED TO THE ACRE.

In this experiment seeding was done with press drill and the rate of seeding varied from one-half bushel to four bushels to the acre. Our best yield was obtained from the seeding at the rate of two (2) bushels to the acre.

EXPERIMENT NO. 74.

SOUTHERN VS. NORTHERN GROWN SEEDS.

The theory that Southern grown seed produced more stover and less grain than Northern seed, and that Northern seed produced more grain and less stover than Southern seed, which was corroborated almost to the variety in our tests of corn during 1893, (See Bulletin No. 10 of this Station.) is not substantiated in the test of oats. The variety of oats yielding the most straw came from Nebraska. The variety yielding the most grain was from seed grown in Oklahoma. In taking the average of all seed grown to the north of us and comparing them with those kinds grown either in Oklahoma or at points as far south, we have:

	Acre yield.	
	Grain.	Straw.
Southern grown seed, (50 varieties.)..	13.8	3371.1.
Northern grown seed, (34 varieties.)..	12.4	3156.3.

Showing the seed grown in Oklahoma and at points in the same latitude produced more grain and more straw to the acre than was produced from seed grown north of us.

These results would lead us to believe that Oklahoma seed are best for Oklahoma, and adding the information gained from the work in corn, which may not be true, points to the north of us are next best where grain is the main object, and points to the south of us if forage is the object sought in growing the crop.

EXPERIMENT NO. 52.

ACRE CONTINUOUSLY WITHOUT MANURE.

In the acre continuously without manure, the yield was as below: Variety, Lincoln; straw 3345; grain, 18 bu.; test, 21 lbs. This variety will be used year after year on the same acre with a view of studying several points which may arise from such a practice.

1893,	Straw 3345	Grain 18 bu.	Test 21 pounds.
1894,	" 2640.5	38.8 "	" 30 "

EXPERIMENT NO. 35.

SUBSOILING VS. NON-SUBSOILING.

The soil used for this experiment is full of alkali (probably sodium sulphate) and the main object was to determine the value of subsoiling such lands. The

two plats were plowed, harrowed and seeded in the same manner, except that a subsoil plow running eighteen inches deep followed the stirring plow on one of the plats.

	Grain.	Straw.	Test.
Subsoiled plat	500	20.10	21.8
Non subsoiled plat	846	23.84	2.3

From this it would appear that the subsoiling was not only of no value, but positively detrimental to oats on alkali soils. This we can not believe is the general rule in such cases, and other work will have to supplement this before we can make any recommendation. It is likely that a greater amount of alkali was on the subsoiled plat, although the ground was laid off to divide equally between the two plats the amount of alkali as nearly as possible.

EXPERIMENT NO. 2.

TEST OF VARIETIES 1893.

The four varieties maturing in the **fewest** number of days are: Alabama, Pringle's Progress, Red Rust Proof and Black Russian, which required an average of ninety days, and have an average yield of 20.2 bushels of grain and 3,143.7 pounds of straw to the acre. Test, 16.87 pounds to the struck bushel.

The four varieties requiring the **greatest** number of days to mature are: Welsh, Seizure, Golden Giant and Hopetown, which required an average of 103 days and yielded 4.27 bushels of grain and 3,143.7 pounds of straw to the acre. Test, 18.32 pounds to the struck bushel.

White Russian, from seed raised near the Station farm in 1892 made the highest yield of grain, 28.9 bushels to the acre, while a White Russian variety grown on the farm in 1892 showed the highest test, 26.5 pounds to the bushel. Plat No. 10, Hargett's White, from Nebraska, made the largest yield of straw, 4800 pounds to the acre, followed closely by plat 25, Welsh, and plat 56, Pringle's American Triumph.

Those interested in this work may secure detailed descriptions of any varieties in the test. The general public is concerned with results only, as is shown in the number of days to maturity, the yield of grain and straw, and the weight of a bushel; while there may be those who care for other observations, such as height, color, and character of the straw, length of head, which may be gotten by addressing the Department of Agriculture of this Station.

The variety test last year (1894) comprised but eight kinds. These were selected as the eight best from the year before. The yields of grain were as follows:

	Bu.	Test.
White Russian,	21.7.	21.6.
Hargett's White,	28.5.	28.
New Red Rust Proof,	27.2.	24.5.
Black Russian,	34.7.	25.5.
Pringle's Progress,	35.4.	28.
White Russian, (Native.)	24.	
Red Rust Proof,	16.9.	25.
Lincoln,	38.8.	34.4.

It will be noticed that all varieties, except Lincoln, tested lower than the standard (32 pounds to the bushel). All were more or less attacked by rust and smut, yet the Lincoln was least effected.

TABLE NO. 1, TEST OF VARIETIES.

Plot No.	Designation.	Source.	Condition at harvest.	Acre yield.		Test. po'nds to bush'l
				Bush. of grain	Po'nds of straw.	
1	White Russian.	Okla. Station.	Good.	14.8	3000	26.5
2	White Russian.	Stillwater.	"	28.9	4125	19.
3	Alabama.	Neb. Ex. Sta.	"	14.	2075	20.
4	White Wonder.	"	"	7.8	2300	22.
5	White California.	"	"	2.3	3375	20.5
6	E'y. Prize Cluster.	"	"	10.1	3750	19.8
7	White Canadian.	"	"	17.1	3625	19.
8	Wide Awake.	"	Badly down.	13.2	2950	20.3
9	Japan.	"	"	14.8	3375	19.3
10	Hargett's White.	"	Fair.	26.5	4800	23.
11	White Russian.	"	"	14.	3150	22.6
12	White Swiss.	"	Badly down.	13.2	3750	20.5
13	White Victoria.	"	Good.	15.6	4075	21.
14	Barley.	"	Badly down.	6.2	2000	17.25
15	White Schonen.	"	"	14.	3600	17.16
16	E'y. Swedish.	"	"	9.3	4175	17.
17	Badger Queen.	"	Fair.	13.2	4000	18.3
18	Currie's Prize Cluster.	"	"	8.6	4050	17.25
19	Clydesdale.	"	"	5.5	3950	18.5
20	Henderson's Clydesdale.	"	"	7.8	3775	17.3
21	State of North Dakota.	"	D'n very b'dly	9.3	3675	17.6
22	Colonel.	"	"	5.5	3625	14.75
23	White Bedford.	"	Fair.	18.7	3525	20.
24	White Belgian.	"	Badly down.	3.9	3075	19.
25	Welsh.	"	Good.	3.9	4775	16.75
26	Yankee Prolific.	"	Badly down.	7.0	3175	16.
27	Welcome.	"	D'n very b'dly	11.7	3650	17.75
28	White Bonanza.	"	Good.	15.6	3550	19.6
29	Seizure.	"	"	1.5	2700	15.
30	Centennial Yellow.	"	Down.	3.1	3625	15.
31	Probsteier.	"	"	7.0	3925	17.
32	Potato.	"	"	10.1	3100	18.5
33	E'y. Dakota.	"	"	14.	3550	15.25
34	Egyptian.	"	Good.	10.9	3525	17.25
35	Hopetown.	"	"	7.8	3825	19.50
36	Pringle's American Triumph	"	"	10.9	3100	16.50
37	American Beauty.	"	Badly down.	14.8	3950	17.
38	Banner.	"	Fair.	12.5	3800	15.6
39	Imperial American.	"	"	13.2	3950	16.5
40	Pringle's Progress.	"	"	22.6	3375	17.3
41	Welcome.	Ky. Ex. Sta.	"	14.8	3775	18.3
42	Scottish Chief.	Neb. Ex. Sta.	Badly down.	14.8	4025	17.5
43	Golden Giant.	"	Good.	7.8	3100	15.5
44	Golden Yellow French.	"	"	7.8	2600	16.
45	Golden Giant Side.	Ky. Ex. Sta.	"	9.3	3350	15.
46	Red Rust Proof.	?	"	24.2	2225	22.6
47	New Red Rust Proof.	Neb. Ex. Sta.	"	22.6	2700	20.6
48	Race Horse.	Ky. Ex. Sta.	D'n very b'dly	14.	2875	20.

TABLE NO. 1, TEST OF VARIETIES.—CONCLUDED.

39.

Plat No.	Designation.	Source.	Condition at harvest.	Acre yield.		Test. po'nds to bush'l
				Bush. of grain	Po'nds of Straw	
49	Probsteier.....	Ky. Ex. Sta.	D'n very b'dly	15.6	3725	17.5
50	White Victoria.	"	"	13.2	3850	18.5
51	Clydesdale.	"	"	9.3	3225	16.25
52	White Canadian.	"	Down.	10.1	2625	18.5
53	White Russian.	"	Good.	12.5	3300	18.5
54	American Banner.	"	"	14.	3175	18.6
55	Bohemian.	"	Down.	17.9	3050	19.
56	Pringle's American Triumph	"	"	14.8	4375	18.6
57	Welsh.	"	"	15.6	3225	18.
58	Monarch.	"	"	16.4	3350	18.7
59	Barley.	"	"	10.1	3775	17.
60	Hoggett's White Seizure. .	"	"	7.	3175	20.
61	E'y. Lackawana.	"	"	15.6	4000	17.5
62	Badger Queen.	"	Down badly.	10.9	4275	17.5
63	White Wonder.	"	Fair.	15.6	4100	20.
64	E'y. Dakota.	"	Down badly.	14.	3850	18.
65	Black Tartarian.	"	Fair.	9.3	3475	16.5
66	Black Tartarian.	Neb. Ex. Sta.	"	4.7	3000	14.
67	Black Prolific.	"	"	5.5	2875	15.
68	Black Prolific.	Ky. Ex. Sta.	"	6.2	2775	16.
69	Prince Edward's Island.	Neb. Ex. Sta.	Good.	3.1	2850	13.
70	Monarch.	"	"	21.8	3300	19.
71	Dakota Gay.	"	"	3.1	2600	13.
72	Black Russian.	"	"	22.6	3775	21.
73	Black Norway.	"	"	7.0	2875	17.
74	Rust Proof.	"	"	21.8	3575	21.
75	Black Tartarian.	Okla. Sta.	Fair.	7.8	2775	14.
76	Archangel.	"	"	18.7	3200	24.3
77	Clydesdale.	"	Good.	11.7	2725	20.75
78	Golden Giant.	"	"	6.2	2125	15.
79	Hopetown.	"	"	3.9	2675	19.5
80	Imperial Welcome.	"	Badly down.	5.5	2850	19.6
81	Probsteier.....	"	Good.	12.5	3400	19.
82	Race Horse.	"	"	17.1	3725	18.
83	American Banner.	"	Down badly.	8.6	3550	15.6
84	Bonanza.	"	Good.	14.	3500	18.3
85	Forty Pound.	"	"	9.3	3000	17.5

EXPERIMENT NO. 79.

FALL VS. SPRING PLOWING FOR OATS.

In this experiment three acres of land was all that was available. One acre was plowed five inches deep in the fall, one was plowed eight inches deep in the fall, and the other acre was plowed eight inches deep the following spring.

OKLAHOMA EXPERIMENT STATION.

Acre plowed shallow in fall yielded 33.9 bushels.
Acre plowed deep in the fall yielded 34.8 bushels.
Acre plowed deep in spring yielded 32.0 bushels.

These results show the value of deep fall plowing and this practice is earnestly recommended to our farmers. The weight of a bushel of grain grown on the plats as above showed a test of 33 pounds for shallow fall plowing; 34.4 pounds for deep fall plowing, and 32 pounds for deep spring plowing.

RECOMMENDATIONS.

1. Put in oats early.
2. Use press drill.
3. Lincoln is as good an oat as you can plant.
4. Try the hot water treatment for preventing smut.
5. Rolling the oat seed bed is desirable when the plowing has been done late and the soil has not had time to become firm.
6. Two bushels of oats to the acre was our best rate of seeding.
7. Deep fall plowing is best for oats.