

EXPERIMENT STATION  
OF THE  
KANSAS STATE AGRICULTURAL COLLEGE,  
MANHATTAN.

---

BULLETIN NO. 42—DECEMBER, 1893.

---

FARM DEPARTMENT.

C. C. GEORGESON, M. Sc.,  
*Professor of Agriculture, and Superintendent of Farm.*  
F. C. BURTIS, B. Sc., *Assistant.*  
D. H. OTIS, B. Sc., *Assistant.*

---

EXPERIMENTS WITH OATS.

---

THE experiments reported in this bulletin cover two years, 1892 and 1893. Neither season has been favorable to the oat crop.

In 1892, the experiments were carried out on a piece of rented land of poor quality, it having been cropped with corn almost continuously for 12 or 15 years. In the early part of the spring the ground was very wet, and later it dried to a degree which caused it to break and crack. The result was, that the oats were badly stunted, many plats being scarcely more than a foot high. Under such conditions the results of experiments could not be regarded with the same confidence that they might be in a normal season. It was for this reason, chiefly, that no bulletin on our field experiments with oats was published for that year. The results have, however, been condensed, and are given below in connection with the results for 1893.

The season of 1893 was rather more favorable than the preceding one, and the yields were, on the whole, somewhat better, but still it was by no means all that could be desired. The plats were this year laid out in field

"C" of the College farm, with the exception of a few in the adjoining field, "D." The soil is a medium clay loam of only moderate fertility. The spring was favorable to the oat crop, but in May a period of dry weather set in, which retarded the crop considerably. In June, seasonable rains forced the crop ahead until the straw averaged from 3 to 3½ feet in height on most of the plats, but in the latter part of that month, before the grain was ripe, several heavy rain- and windstorms lodged the crop nearly uniformly on all the plats, from which it never recovered. The crop also suffered severely from rust. These causes prevented the grain from developing fully. The yields were in most cases light, and the grain of an inferior quality.

The line of experiments has been the same as that already reported upon in previous bulletins, nor has there been any marked variation from previous years in the methods adopted. Each experiment has been tried on five plats, which have been so arranged among those with which they were to be compared that the experiments would be placed under the same condition as to exposure and quality of soil, and the conclusions are based on the average result of each set of five plats.

The plats were in most cases one-twentieth of an acre in extent. They were laid out with accuracy, and marked by stakes driven at each corner. Equal quantities of seed were put on plats of equal size, unless the experiments required different amounts; and, except in the experiment with different methods of seeding, all plats were seeded by a Richmond Champion shoe drill. Care has been taken at every step to have all the conditions over which we have any control alike, for all the plats in a given experiment, and for experiments intended to be compared together. The following is the line of experiments for the years named:

- I. Oats on land fall plowed, spring plowed, and not plowed.
- II. Time of seeding oats.
- III. Treating oats with hot water for smut.
- IV. Grading oats for seed.
- V. Methods of seeding oats:
  - (a) Broadcast.
  - (b) Seeding with hoe drill.
  - (c) Seeding with shoe drill with press wheels.
  - (d) Seeding with shoe drill without press wheels.
- VI. Amount of seed oats to sow per acre.
- VII. Test of varieties.

#### I.—LAND FALL PLOWED, SPRING PLOWED, AND NOT PLOWED.

As shown in the accompanying table, 20 plats were devoted to this experiment. They were seeded at the rate of 2½ bushels per acre, and all the seed was treated for smut by the hot-water method. On five plats, the seed was put in on the unplowed corn stubble with a press drill. Five plats

were sown broadcast on the unplowed corn stubble and cultivated in. Five plats had been fall plowed and five plats were spring plowed just before seeding. The plats were arranged among each other as shown in the table. The averages explain themselves.

TABLE I.—LAND FALL PLOWED, SPRING PLOWED, AND NOT PLOWED.

No. of plat.	Treatment of the ground and method of seeding.	YIELD PER PLAT.		YIELD PER ACRE.	
		Grain, pounds.	Straw, pounds.	Grain, bushels.	Straw, tons.
1	Ground not plowed, seed cultivated in.....	58.00	182	36.25	1.82
2	Ground not plowed, seed drilled in.....	44.50	80	27.81	.80
3	Ground spring plowed, seed drilled in.....	69.00	161	43.12	1.61
4	Ground fall plowed, seed drilled in.....	55.50	129	34.68	1.29
5	Ground not plowed, seed cultivated in.....	59.50	165	37.18	1.65
6	Ground not plowed, seed drilled in.....	59.00	121	36.87	1.21
7	Ground spring plowed, seed drilled in.....	57.50	112	35.93	1.12
8	Ground fall plowed, seed drilled in.....	60.00	130	37.50	1.30
9	Ground not plowed, seed cultivated in.....	50.00	120	31.25	1.20
10	Ground not plowed, seed drilled in.....	44.50	85	27.81	.85
11	Ground spring plowed, seed drilled in.....	54.50	130	34.06	1.30
12	Ground fall plowed, seed drilled in.....	52.50	122	32.81	1.22
13	Ground not plowed, seed cultivated in.....	51.00	124	31.87	1.24
14	Ground not plowed, seed drilled in.....	60.50	119	37.81	1.19
15	Ground spring plowed, seed drilled in.....	59.00	156	36.87	1.56
16	Ground fall plowed, seed drilled in.....	54.50	125	34.06	1.25
17	Ground fall plowed, seed drilled in*.....	57.00	118	35.62	1.18
18	Ground spring plowed, seed drilled in.....	54.00	91	33.75	.91
19	Ground not plowed, seed cultivated in.....	56.00	114	35.00	1.14
20	Ground not plowed, seed drilled in.....	48.00	137	30.00	1.37

\* Order changed by mistake in plowing.

	Grain, bushels.	Straw, tons.
<i>Average yield per acre:</i>		
Ground not plowed, seed cultivated in.....	33.31	1.45
Ground not plowed, seed drilled in.....	33.06	1.03
Ground spring plowed, seed drilled in.....	36.75	1.30
Ground fall plowed, seed drilled in.....	34.93	1.44
<i>Average yield per acre, 1892:</i>		
Ground not plowed, seed cultivated in.....	14.06	.29
Ground not plowed, seed drilled in.....	18.16	.45
Ground spring plowed, seed drilled in.....	20.56	.43
<i>Average yield per acre, 1891:</i>		
Ground not plowed, seed cultivated in.....	52.72	1.45
Ground spring plowed, seed drilled in.....	57.81	1.55
Ground fall plowed, seed drilled in.....	59.47	1.48
<i>Average yield per acre, 1890:</i>		
Ground not plowed, seed cultivated in.....	29.55	1.98
Ground not plowed, seed drilled in.....	34.52	1.70
Ground spring plowed, seed drilled in.....	33.50	1.86

II.—TIME OF SEEDING OATS.

Forty-five plats were devoted to this experiment, as shown in the table. The land was fall plowed, and the plats seeded at the uniform rate of 2½ bushels per acre, the seed having been treated for smut by the hot-water method. The Red Georgia was the variety used in this, as in all other experiments. The plats seeded March 8 did not appear green until March 29. The seed sown March 15 appeared above ground April 1; and that sown March 22 was visible April 4. All succeeding seasons appeared above ground in six or seven days. During the last seedings, April 19, 26, and May 3, the weather was dry and windy. On June 1, it was noted that

there was a nearly regular gradation in the height of the several seedings, the first seeding being two feet high, and the last seeding only three or four inches. Table II gives details of the yields of the plats, as well as averages of results. This experiment has been attempted in former years, but owing to unfavorable weather it has not been carried out with regularity until the present season; hence there is nothing from former years to compare with. It is worthy of notice that the earliest seeding gave the best yield.

TABLE II.—TIME OF SEEDING.

No. of plat.	Date seeded.	Date of heading.	Date when ripe.	YIELD OF PLAT.		YIELD PER ACRE.	
				Grain, pounds.	Straw, pounds.	Grain, bushels.	Straw, tons.
21.	March 8	June 1	June 27	60.00	135.00	37.50	1.35
22.	" 15	" 2	" 28	60.00	140.00	37.50	1.40
23.	" 22	" 5	July 1	58.00	137.00	36.25	1.37
24.	" 29	" 7	" 4	47.00	138.00	29.37	1.38
25.	April 5	" 13	" 6	39.00	131.00	24.37	1.31
26.	" 12	" 17	" 8	39.00	166.00	24.37	1.66
27.	" 19	" 19	" 10	27.50	112.00	17.18	1.12
28.	" 26	" 23	" 12	16.00	104.00	10.00	1.04
29.	May 3	" 27	" 14	6.50	128.00	4.06	1.28
30.	March 8	" 1	June 27	69.50	125.00	43.43	1.25
31.	" 15	" 2	" 28	63.50	81.00	39.68	.81
32.	" 22	" 5	July 1	46.00	104.00	28.75	1.04
33.	" 29	" 7	" 4	46.00	89.00	28.75	.89
34.	April 5	" 13	" 6	40.50	104.00	25.31	1.04
35.	" 12	" 17	" 8	37.00	98.00	23.12	.98
36.	" 19	" 19	" 10	27.00	98.00	16.87	.98
37.	" 26	" 23	" 12	21.50	108.00	13.43	1.08
38.	May 3	" 27	" 14	8.00	127.00	5.00	1.27
39.	March 8	" 1	June 27	52.00	133.00	32.50	1.33
40.	" 15	" 2	" 28	58.00	112.00	36.25	1.12
41.	" 22	" 5	July 1	49.00	171.00	30.62	1.71
42.	" 29	" 7	" 4	44.00	96.00	27.50	.96
43.	April 5	" 13	" 6	37.50	97.00	23.43	.97
44.	" 12	" 17	" 8	35.00	110.00	21.87	1.10
45.	" 19	" 19	" 10	25.50	96.00	15.93	.96
46.	" 26	" 23	" 12	14.00	96.00	8.75	.96
47.	May 3	" 27	" 14	8.00	107.00	5.00	1.07
48.	March 8	" 1	June 27	58.50	126.00	36.36	1.26
49.	" 15	" 2	" 28	57.00	133.00	35.62	1.33
50.	" 22	" 5	July 1	49.50	165.00	30.93	1.65
51.	" 29	" 7	" 4	44.50	100.00	27.81	1.00
52.	April 5	" 13	" 6	36.00	114.00	22.50	1.14
53.	" 12	" 17	" 8	36.00	99.00	22.50	.99
54.	" 19	" 19	" 10	31.00	89.00	19.37	.89
55.	" 26	" 23	" 12	22.00	108.00	13.75	1.08
56.	May 3	" 27	" 14	9.00	128.00	5.62	1.26
57.	March 8	" 1	June 27	56.00	99.00	35.00	.99
58.	" 15	" 2	" 28	53.50	101.00	33.43	1.01
59.	" 22	" 5	July 1	49.50	115.00	30.93	1.15
60.	" 29	" 7	" 4	53.50	106.00	33.43	1.06
61.	April 5	" 13	" 6	39.00	91.00	24.37	.91
62.	" 12	" 17	" 8	33.00	82.00	20.62	.82
63.	" 19	" 19	" 10	27.00	83.00	16.87	.83
64.	" 26	" 23	" 12	17.00	78.00	10.62	.78
65.	May 3	" 27	" 14	7.50	92.00	4.68	.92

AVERAGE YIELD PER ACRE.

Date seeded.	Date of heading.	Date when ripe.	Grain, bushels.	Straw, tons.
March 8.....	June 1.....	June 27.....	37.00	1.23
“ 15.....	“ 2.....	“ 28.....	36.50	1.13
“ 22.....	“ 5.....	July 1.....	31.50	1.38
“ 29.....	“ 7.....	“ 4.....	29.37	1.05
April 5.....	“ 13.....	“ 6.....	24.00	1.07
“ 12.....	“ 17.....	“ 8.....	22.50	1.11
“ 19.....	“ 19.....	“ 10.....	17.25	.92
“ 26.....	“ 23.....	“ 12.....	11.31	.98
May 3.....	“ 27.....	“ 14.....	4.87	1.16

III.—TREATING OATS WITH HOT WATER FOR SMUT.

Ten plats were devoted to this experiment. The plats were seeded March 21, with a shoe press drill. The treatment consisted in inserting the seed in hot water, at the temperature of 133 deg. Fahr., for 10 minutes. The seed was of our own raising, and contained but very little smut, as is shown by the table, owing probably to the fact that the oats from which the seed was raised was treated for smut for three years in succession. Table III shows the results. The small per cent. of smutted heads found in the untreated plats would indicate that it is not necessary to treat the seed for smut every year after the smut has once been subdued, except possibly when it is exposed to infection from an adjoining smutty field.

The averages show a difference of three bushels in favor of the treated oats for the three years the experiment has been tried; but, as indicated above, the crops of 1892 and 1893 contain very little smut, while the crop of 1891, which was the first year our oats were treated in this manner, was very smutty. The difference in favor of the treated seed for that year was eight bushels per acre, and the three bushels in favor of treating, shown by the average, are chiefly to be ascribed to the difference found between treated and untreated seed in 1891.

TABLE III.—TREATING OATS WITH HOT WATER FOR SMUT.

No. of plat.	Treatment of seed.	Per cent. of smut, heads.	YIELD OF PLAT.		RATE PER ACRE.	
			Grain, pounds.	Grain, pounds.	Grain, bushels.	Straw, tons.
66.....	Treated.....	0.00	48.50	86	30.31	.86
67.....	Not treated.....	.26	49.00	81	30.62	.81
68.....	Treated.....	0.00	54.00	111	33.75	1.11
69.....	Not treated.....	.56	50.00	75	31.25	.75
70.....	Treated.....	0.00	49.50	115	30.93	1.15
71.....	Not treated.....	.40	46.00	99	28.75	.99
72.....	Treated.....	.02	52.00	133	32.50	1.33
73.....	Not treated.....	.50	43.50	86	27.18	.86
74.....	Treated.....	0.00	40.50	144	25.31	1.44
75.....	Not treated.....	0.10	46.50	104	28.43	1.04

	<i>Per cent. of smut, heads.</i>	<i>Grain, bushels.</i>	<i>Straw, tons.</i>
<i>Average yield per acre:</i>			
Treated.....	.004	30.56	.99
Not treated.....	.296	29.24	.88
<i>Average result for three years:</i>			
Treated.....		29.41	.....
Not treated.....		26.40	.....

The method of treatment has not been varied from previous years, and it is therefore stated as it appeared in Bulletin No. 29:

The seed was immersed for 10 minutes, by the watch, in water having a temperature of 133° F. Immersion for that length of time, at that temperature, has been found to kill the smut without injuring the seed. The water was heated by steam, injected through a pipe which connected with the boiler in the engine room. A thermometer was constantly kept in the water, so there was no guesswork about the temperature. And this, by the way, requires a reliable thermometer.

To aid in maintaining the water at a uniform temperature, we use two tubs, standing side by side, both filled with hot water. If only one tub is used, it will be found that the water is cooled several degrees by the immersion of each basket or sack of seed, and it will thus be difficult to maintain a uniform temperature. But by using two tubs, and immersing the seed first in No. 1 for a moment, until the grain is heated to nearly the required temperature, it can be transferred to No. 2 and kept there the required length of time without materially changing the temperature of that tub. By means of a stopcock on the steam pipe, the steam can be turned on at any moment, as may be required to maintain the heat of the water.

While steam is a very convenient means of heating the water, it is not at all necessary. An ordinary wash boiler on a stove will answer every purpose, and a few dipperfuls transferred from the boiler to the tubs, as occasion may demand, will be amply sufficient to keep up the required temperature. For immersion, the seed can be placed in any porous receptacle which will freely admit the water. Here at the Station we use for that purpose cylindrical baskets, made of wire gauze secured to an iron frame; but a gunny sack might answer the same purpose, or any basket of wickerwork, the main qualification being that it is open enough not to hinder the passage of water, and still close enough to retain the grain.

After treatment, the grain should be dried enough to sow it, and the sooner it gets into the ground the better. By scattering it in a thin layer on the barn floor, or on a loft, or even on a canvas, out of doors, if the weather is dry, it will soon dry sufficiently to prevent the grains from adhering together and admit of its being sown. Under no circumstances should it be piled up wet and left until it germinates or molds

IV.—GRADING OATS FOR SEED.

This experiment has now been carried out for four years. As the table shows, 15 plats were devoted to it the past season, five to each of the three

grades, respectively denominated "light," "common," "heavy." The plats were seeded March 27, on spring-plowed land, at the rate of 2½ bushels per acre, by measure, all the seed having been treated for smut. The "common" seed was the oats obtained from the thresher, and the "light" and "heavy" grades were obtained by running the "common" grade through the fanning mill, the "light" being that blown over when the crank was turned at a moderate speed, and the "heavy" grade that from which the light oats had thus been separated. The seed weighed, per struck bushel, as follows: Light seed, 18.5 pounds; common, 31.5; and heavy, 34.5. All was seeded with a shoe press drill. The average result for four years is in favor of the heavy seed over the common grade by the amount of nearly two bushels per acre, and over light seed by 3 1/3 bushels per acre.

TABLE IV.—EFFECTS OF QUALITY OF SEED—1893.

No. of plat.	Grade of seed.	YIELD OF PLAT.		RATE PER ACRE.	
		Grain, pounds.	Straw, pounds.	Grain, bushels.	Straw tons.
156.	Light.....	47.50	112	29.68	1.12
157.	Common.....	62.00	108	38.75	1.08
158.	Heavy.....	64.00	121	40.00	1.21
159.	Light.....	58.00	147	36.25	1.47
160.	Common.....	76.00	124	47.50	1.24
161.	Heavy.....	67.00	133	41.87	1.38
162.	Light.....	59.00	121	36.87	1.21
163.	Common.....	67.00	123	41.87	1.23
164.	Heavy.....	56.50	143	35.31	1.43
165.	Light.....	57.00	113	35.62	1.13
166.	Common.....	62.00	113	38.75	1.13
167.	Heavy.....	63.50	101	39.68	1.01
168.	Light.....	51.50	103	32.18	1.03
169.	Common.....	64.00	126	40.00	1.26
170.	Heavy.....	59.00	106	36.87	1.06

	Gram, bushels.	Straw, tons.
<i>Average yield per acre:</i>		
Light seed.....	34.12	1.19
Common seed.....	41.37	1.19
Heavy seed.....	38.75	1.21
<i>Averages for 1892</i>		
Light seed.....	21.87	.34
Common seed.....	23.59	.52
Heavy seed.....	26.40	.48
<i>Averages of four years' trials:</i>		
Light seed.....	32.05	1.08
Common seed.....	33.55	1.24
Heavy seed.....	35.39	1.17

V.—METHODS OF SEEDING OATS.

The ground for this experiment was fall plowed, and the plats seeded March 22, the seed having been treated for smut by the hot-water method. Twenty plats were used, representing four methods of seeding, as follows:

- (a) Broadcasted, and seed covered with spring-tooth harrow.
- (b) Hoe drill.
- (c) Shoe drill with press wheels.

(d) Shoe drill without press wheels.

The drill used was the same for all, the shoes being exchanged for hoes, and the press wheels removed at pleasure. This method of seeding has been followed for three years, for which the averages are shown in the accompanying table. It will be noticed that the results are in favor of the shoe drill with press wheels.

TABLE V.—METHODS OF SEEDING OATS.

No. of plat.	Method of seeding.	YIELD OF PLAT.		YIELD PER ACRE.	
		Grain, pounds.	Straw, pounds.	Grain, bushels.	Straw, tons.
86.....	Broadcast.....	43.00	87	26.87	.87
87.....	Hoe drill.....	52.50	117	32.81	1.17
88.....	Shoe drill with press wheels.....	64.00	116	40.00	1.16
89.....	Shoe drill without press wheels.....	71.00	114	44.37	1.14
90.....	Broadcast.....	54.50	120	34.06	1.20
91.....	Hoe drill.....	47.00	93	29.37	.93
92.....	Shoe drill with press wheels.....	49.50	115	30.93	1.15
93.....	Shoe drill without press wheels.....	51.50	113	32.18	1.13
94.....	Broadcast.....	42.00	113	26.25	1.13
95.....	Hoe drill.....	39.00	86	24.37	.86
96.....	Shoe drill with press wheels.....	48.50	111	30.31	1.11
97.....	Shoe drill without press wheels.....	37.00	78	23.12	.78
98.....	Broadcast.....	34.50	95	21.56	.95
99.....	Hoe drill.....	38.00	92	23.75	.92
100.....	Shoe drill with press wheels.....	44.00	116	27.50	1.16
101.....	Shoe drill without press wheels.....	48.50	101	30.31	1.01
102.....	Broadcast.....	51.50	128	32.18	1.28
103.....	Hoe drill.....	54.50	125	34.06	1.25
104.....	Shoe drill with press wheels.....	44.00	131	27.50	1.31
105.....	Shoe drill without press wheels.....	54.50	115	34.06	1.15

<i>Average yield per acre:</i>	<i>Grain, bushels.</i>	<i>Straw, tons.</i>
Broadcast.....	28.18	1.08
Hoe drill.....	28.38	1.02
Shoe drill with press wheels.....	31.25	1.17
Shoe drill without press wheels.....	32.81	1.04
<i>Average for 1892:</i>		
Broadcast.....	24.87	.35
Hoe drill.....	29.00	.61
Shoe drill with press wheels.....	35.06	.52
Shoe drill without press wheels.....	26.00	.45
<i>Averages of three years' trials:</i>		
Broadcast.....	32.20	.92
Hoe drill.....	34.62	.96
Shoe drill with press wheels.....	39.34	1.01
Shoe drill without press wheels.....	36.48	.95

VI—AMOUNT OF SEED OATS TO SOW PER ACRE.

Thirty-five plats were devoted to this experiment. Beginning the seeding with a rate of one bushel per acre, the amount was successively increased by half a bushel at a time up to four bushels. The results are given in the accompanying table. It will be seen from the averages of three years' trials, as given below, that the heaviest seedings have given the best returns. The usual amount of seed oats in this section of the state is from 2 to 2½ bushels per acre. The average yield for three years, at the rate of two bushels of seed, is 35.36 bushels per acre and one ton of straw,



but double that amount of seed averages 42.37 bushels per acre and 1.1 tons straw. This is an increase of seven bushels, or a net gain of five bushels per acre over the amount sown by many farmers.

TABLE VI.—SEEDING DIFFERENT AMOUNTS TO THE ACRE.

No. of plat.	Rate of seeding per acre.	YIELD OF PLAT.		RATE PER ACRE.	
		Grain, pounds.	Straw, pounds.	Grain, bushels.	Straw, tons.
121.	1.0 bushels	65.00	165	40.62	1.65
122.	1.5 "	67.00	133	41.87	1.33
123.	2.0 "	78.00	192	48.75	1.92
124.	2.5 "	74.00	186	46.25	1.86
125.	3.0 "	83.00	147	51.87	1.47
126.	3.5 "	66.00	114	41.25	1.14
127.	4.0 "	82.50	177	51.56	1.77
128.	1.0 "	62.00	178	38.75	1.78
129.	1.5 "	67.00	188	41.87	1.88
130.	2.0 "	45.00	115	28.12	1.15
131.	2.5 "	57.00	118	35.62	1.18
132.	3.0 "	52.50	112	32.81	1.12
133.	3.5 "	54.00	71	33.75	.71
134.	4.0 "	42.50	82	26.56	.82
135.	1.0 "	42.00	73	26.25	.73
136.	1.5 "	34.00	61	21.25	.61
137.	2.0 "	41.00	24	25.62	.24
138.	2.5 "	43.00	67	26.87	.67
139.	3.0 "	38.50	56	24.06	.56
140.	3.5 "	38.00	47	23.75	.47
141.	4.0 "	42.00	.....	26.25	.....
142.	1.0 "	38.00	57	23.75	.75
143.	1.5 "	43.50	67	29.68	.67
144.	2.0 "	44.50	65	27.81	.65
145.	2.5 "	37.50	.....	23.43	.....
146.	3.0 "	32.00	38	20.00	.38
147.	3.5 "	44.50	65	27.81	.65
148.	4.0 "	40.00	40	25.00	.40
149.	1.0 "	35.50	34	22.18	.34
150.	1.5 "	32.00	83	20.00	.83
151.	2.0 "	37.50	97	23.43	.97
152.	2.5 "	36.00	99	22.50	.99
153.	3.0 "	52.00	68	32.50	.68
154.	3.5 "	46.50	108	29.06	1.08
155.	4.0 "	59.00	101	36.87	1.01

<i>Average yield per acre:</i>		<i>Grain,</i>	<i>Straw,</i>
1.0 bushels of seed	.....	bushels.	tons.
1.5 "	.....	30.31	1.01
2.0 "	.....	30.93	1.06
2.5 "	.....	30.75	.98
3.0 "	.....	30.93	.....
3.5 "	.....	32.25	.84
4.0 "	.....	31.12	.81
.....	.....	33.25	.....
<i>Average for 1892:</i>			
1.0 bushels of seed	.....	20.78	.33
1.5 "	.....	28.79	.37
2.0 "	.....	32.08	.50
2.5 "	.....	34.36	.48
3.0 "	.....	31.76	.54
3.5 "	.....	34.26	.51
4.0 "	.....	47.63	.79
<i>Averages of three years' trials:</i>			
1.0 bushels of seed	.....	27.44	.90
1.5 "	.....	31.30	.95
2.0 "	.....	35.36	1.00
2.5 "	.....	36.80	1.02
3.0 "	.....	36.28	1.03
3.5 "	.....	36.96	.93
4.0 "	.....	42.37	1.10

VII.—TEST OF VARIETIES.

Table VII shows the varieties tested in 1893, and the yield of each in grain and straw; and table VIII shows the varieties tested during the last three seasons, arranged according to average yield during that time.

TABLE VII.

No. of plot	Variety.	When headed.	When ripe.	RATE OF YIELD PER ACRE.	
				Grain, bushels.	Straw, tons.
1	Burt's Extra Early Rust Proof.....	May 30	June 25	29.15	1.39
2	Black Russian.....	June 10	July 4	22.67	1.81
3	Pedigree Red Rust Proof.....	" 10	" 4	28.88	1.46
4	Red Georgia.....	" 9	" 4	27.81	1.43
5	Red Rust Proof.....	" 9	" 4	34.78	1.68
6	South Carolina Black.....	" 9	" 4	38.09	1.47
7	Belgian.....	" 7	" 1	39.59	2.34
8	Golden Sheaf.....	" 16	" 9	23.95	1.92
9	Monarch.....	" 10	" 6	19.40	1.56
10	Early Lackawanna.....	" 12	" 8	21.95	2.04
11	Black American.....	" 13	" 8	18.78	1.51
12	State of North Dakota.....	" 14	" 10	24.50	2.05
13	American Beauty.....	" 14	" 10	29.61	1.24
14	Board of Trade.....	" 16	" 10	36.25	2.27
15	Belgian.....	" 7	" 1	38.29	1.99
16	Golden Sheaf.....	" 16	" 9	27.57	1.51
17	White California.....	" 16	" 9	25.01	2.27
18	Colonel.....	" 17	" 12	28.59	2.26
19	Belgian.....	" 7	" 1	38.80	1.91
20	Colorado Yellow.....	" 17	" 11	29.99	1.81
21	Improved American.....	" 18	" 11	28.59	1.19
22	Probsterr.....	" 18	" 10	28.08	2.64
23	White Shonen.....	" 17	" 10	26.55	1.61
24	Golden Sheaf.....	" 16	" 9	21.44	1.28
25	Yankee Prolific.....	" 13	" 8	31.65	2.10
26	Blue Grazing Winter.....	" 12	" 7	20.93	1.77
27	Brown Winter.....	" 12	" 8	29.10	1.79
28	New Seneca Chief.....	" 18	" 13	27.06	1.76
29	Northwestern White.....	" 18	" 13	32.16	1.86
30	Race Horse.....	" 19	" 13	31.60	1.84
31	Belgian.....	" 7	" 1	33.42	.91
32	Golden Sheaf.....	" 16	" 12	17.01	.89
33	Surprise.....	" 19	" 14	23.09	1.47
34	Welsh.....	" 15	" 10	28.56	1.92
35	Vick's American Banner.....	" 18	" 14	31.60	1.34
36	New Swedish.....	" 20	" 14	24.91	1.43
37	White Side.....	" 18	" 14	32.81	1.51
38	White Swedc.....	" 18	" 14	20.05	1.22
39	Belgian.....	" 7	" 1	27.34	.91
40	Golden Sheaf.....	" 16	" 12	15.80	.52
41	Prince Edward Island Black.....	" 22	" 14	21.26	1.30
42	Wide-Awake.....	" 18	" 12	21.26	1.01

TABLE VIII.—VARIETIES OF OATS, ARRANGED ACCORDING TO AVERAGE YIELD.

Variety.	AVERAGE, THREE YEARS.		1893.		1892.		1890.	
	Yield, bushels.	Rank.	Yield, bushels.	Rank.	Yield, bushels.	Rank.	Yield, bushels.	Rank.
Pedigree Red Rust Proof.....	44.52	1	28.88	13	58.79	3	45.9	1
Board of Trade.....	43.04	2	36.25	3	58.59	4	34.3	18
Belgian.....	42.64	3	39.59	1	50.25	14	37.9	9
Brown Winter.....	42.03	4	29.10	12	57.09	5	39.9	7
Welsh.....	41.87	5	28.56	16	56.77	6	40.3	6
Golden Sheaf.....	41.26	6	27.57	19	52.42	10	43.9	4
White Side.....	40.38	7	32.81	5	55.75	7	32.6	19

TABLE VIII—CONCLUDED.

Variety.	AVERAGE. THREE YEARS.		1893.		1892.		1890.	
	Yield, bushels.	Rank.	Yield, bushels.	Rank.	Yield, bushels.	Rank.	Yield, bushels.	Rank.
Yankee Prolific .....	39.99	8	31.65	7	51.43	12	36.9	13
Red Rust Proof .....	39.98	9	34.78	4	46.68	28	35.5	17
Northwestern White .....	39.92	10	32.16	6	59.71	2	27.9	27
Probestir .....	39.74	11	28.08	17	46.04	30	45.1	2
South Carolina Black .....	39.33	12	38.09	2	47.42	25	32.5	20
Yick's American Banner .....	38.99	13	31.60	9	46.49	29	38.9	8
Red Georgia .....	38.14	14	27.81	18	41.61	34	45.0	3
White Schoneu .....	37.38	15	26.55	21	49.40	21	36.2	15
State of North Dakota .....	37.30	16	24.50	24	50.40	13	37.0	12
Surprise .....	36.84	17	23.09	26	51.83	11	35.6	16
Colonel .....	36.79	18	28.60	14	49.58	19	32.2	21
Burt's Extra Early Rust Proof .....	36.69	19	29.15	11	44.52	32	36.4	14
Black Russian .....	36.36	20	22.67	27	42.22	33	42.2	5
White Swede .....	36.20	21	20.05	32	59.96	1	28.6	23
Race Horse .....	35.71	22	31.61	8	50.04	15	25.5	30
Early Lackawanna .....	35.56	23	21.95	28	46.93	26	37.8	11
American Beauty .....	35.29	24	29.61	10	47.76	24	28.5	24
White California .....	34.79	25	25.01	22	49.67	18	29.7	22
New Seneca Chief .....	34.71	26	27.06	20	48.98	22	28.1	26
Colorado Yellow .....	34.52	27	23.99	25	45.06	31	.....	.....
Monarch .....	34.01	28	19.40	33	54.33	9	28.3	25
Black American .....	34.00	29	13.78	34	49.75	17	38.5	10
New Swedish .....	32.97	30	24.91	23	48.20	23	25.8	29
Wide-Awake .....	32.55	31	21.26	30	49.51	20	26.9	28
Improved American .....	32.26	32	28.59	15	46.80	27	21.4	32
Blue Grazing Winter .....	31.77	33	20.93	31	54.50	8	19.9	33
Prince Edward Island Black .....	31.52	34	21.27	29	49.81	16	23.5	31