

South Dakota State University
**Open PRAIRIE: Open Public Research Access Institutional
Repository and Information Exchange**

Bulletins

South Dakota State University Agricultural
Experiment Station

3-1-1914

Some Varieties and Strains of Oats and their Yields in South Dakota

A.N. Hume

Manley Champlin

Follow this and additional works at: http://openprairie.sdstate.edu/agexperimentsta_bulletins

Recommended Citation

Hume, A.N. and Champlin, Manley, "Some Varieties and Strains of Oats and their Yields in South Dakota" (1914). *Bulletins*. Paper 149.
http://openprairie.sdstate.edu/agexperimentsta_bulletins/149

This Bulletin is brought to you for free and open access by the South Dakota State University Agricultural Experiment Station at Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in Bulletins by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact michael.biondo@sdstate.edu.

AGRICULTURAL EXPERIMENT STATION

**SOUTH DAKOTA
STATE COLLEGE OF AGRICULTURE
AND MECHANIC ARTS**

AGRONOMY DEPARTMENT

Some Varieties and Strains of Oats and their Yields in South Dakota

BROOKINGS, SOUTH DAKOTA

Bowen Publishing Co., Huron, S. D.

GOVERNING BOARD.

Hon. A. E. Hitchcock, President Mitchell, S. D.
Hon. T. W. Dwight, Vice President Sioux Falls, S. D.
Hon. A. M. Anderson Sturgis, S. D.
Hon. August Frieberg Beresford, S. D.
Hon. M. P. Beebe Ipswich, S. D.

STATION STAFF

T. W. Dwight Regent Member
A. M. Anderson Regent Member
Robert L. Slagle President of College
James W. Wilson Director and Animal Husbandman
N. E. Hansen Vice Director and Horticulturist
James H. Shepard Chemist
C. Larsen Dairy Husbandman
A. N. Hume Agronomist and Superintendent of Sub-Stations
J. G. Hutton Assistant Chief of Agronomy
M. Champlin Assistant Agronomist and Collaborator
Howard Loomis Agronomy Analyst
I. S. Oakland Assistant in Crops
J. D. Morrison...Crops, Detailed by U. S. Department of Agriculture
J. M. Fuller Assistant and Dairy Bacteriologist
D. E. Bailey..... Dairy Analyst
Howard W. Gregory Assistant Dairyman
C. Shanley Assistant Dairyman
Guy E. Youngberg First Assistant in Chemistry
R. A. Larson Secretary and Accountant
E. I. Fjeld Bulletin Clerk and Stenographer

SUMMARY.

- (1) Classification of prominent varieties for South Dakota, according to color, time required for maturity, and shape of panicle. Pages 348 to 350
- (2) Illustrations of some typical varieties grown in South Dakota. Pages 351 to 362
- (3) Highest yields of grain at Brookings have been secured from Sixty-day, Swedish Select and North Finnish Black, in order named. Page 364
- (4) At Highmore, the most productive varieties tested are Swedish Select or Belyak, Sixty-day or Kherson, Red Algerian and North Finnish. Page 365
- (5) Present data indicate that Sixty-day, an early variety and Swedish Select, a late variety, are most successful for conditions of this test. Pages 366.
- (6) Short time comparisons of two varieties at Cottonwood and Eureka are not yet sufficient to lead to permanent conclusions. Page 368.
- (7) History of certain varieties. Pages 369.

SOME VARIETIES AND STRAINS OF OATS AND THEIR YIELDS PER ACRE IN SOUTH DAKOTA.

By A. N. Hume, Agronomist and Superintendent of Substations and Manley Champlin, Assistant Agronomist and Collaborator.

That it is important to the individual farmer and to the state to produce the highest yielding kinds of marketable oats, needs no demonstration.

It is therefore important to know which the highest yielding kinds may be, not only by name, but by sight. It is the purpose of the present bulletin to help the people of South Dakota, especially oat-producers, to arrive at such information.

Accordingly the bulletin is devoted, in the main, first to a classification and description of the varieties of oats most commonly produced on the farms of South Dakota, and second to tabulation of comparative yields of these varieties as determined by field tests at Station fields.

Variety Classification.

Botanically, oats belongs to the family of grasses. Its specific botanical name is *Avena sativa*. The common oats, with which most everyone is somewhat familiar, is by far the principal cultivated plant of this genus *Avena*.

Oats differs from wheat, which is also a grass, chiefly in two respects, (1) the head of oats is a so called panicle, while the head of wheat is a spike, (2) the oat flower has a crooked beard or awn attached to the back of the flowering glume, while the wheat flower has a straight awn attached to the point of the flowering glume.

Throughout the world, all varieties of oats may first be classified as (1) spring varieties or (2) fall varieties, according to their time of being sown. In South Dakota one need not be concerned practically with this part of

the classification of oats, inasmuch as all varieties commonly produced here are spring varieties.

Oats are further classified in general according to color. Thus, they may be either white, black, grey or red. Such a classification is practical rather than absolute. For instance white means the absence of all color, but one calls oats white when the grain has no conspicuous color. It may, for instance, be white oats, but having a yellow tinge, one could call it yellowish white.

In addition to the two means of classifying oats, mentioned above, they are also classified according to time required for growth from seeding time to maturity. Oats are accordingly (1) Early, (2) Medium or (3) Late. In South Dakota, one might define, somewhat arbitrarily that Early Oats are those which grow to maturity from seeding time in ninety-five days or less, that medium oats are those maturing in one hundred ten days or less and late oats, those requiring more than one hundred ten days.

A fourth line of general classification for oats is according to shape of panicle, that is, (1) Spreading oats and (2) Side oats. Spreading oats are those, the panicles of which have their branches extending symmetricaly in all directions from the main stem. Side oats have panicles with branches on one side shortened or appressed in such a way as to make the entire head one-sided. Sometimes side oats are called "rooster tail oats."

The following outline amounts to a classification of important and prominent South Dakota varieties of oats according to the characteristics outlined above.

Classification of Some Spring Varieties of Oats (*Avena Sativa*) Commonly Grown in South Dakota.

I White Oats—Grain, small, slender, pointed.

Grain neither black, red, nor grey. Panicles small.

A—Early—Maturing in 95 days or less.

(a) Spreading—Panicles not distinctly one-sided.

(1) S. D. 158, C. I. 625, Select Sixty-Day.

(2) S. D. 157, C. I. 625, Select Sixty-Day.

(3) S. D. 165, C. I. 165, Sixty-Day.

(4) S. D. 115, C. I. 539, Kherson.

(5) Early Champion.

II—Black Oats—With grain thoroughly dark colored, neither white, gray nor red.

A—Early—Maturing in 95 days or less. Plants generally of small size.

(a) Spreading.

(1) S. D. 174, C. I. 174, North Finnish Black.

B—Medium.

(a) Spreading, with panicles not distinctly one-sided

(b) Side, with one-sided panicles.

(1) Tartarian.

III—Red Oats.

A—Early.

B—Medium.

(a) Spreading—With panicles not distinctly one-sided.

(1) S. D. 286, C. I. 286, Red Algerian.

B—Medium—Maturing in more than 95 days and less than 110. Plants almost invariably larger than those of **early** varieties.

(a) Spreading—Panicles not distinctly one-sided.

(1) S. D. 112, C. I. 134, Swedish Select.

(2) Regenerated Swedish Select.

(3) Siberian.

(4) S. D. 336, C. I. 336, Belyak.

(5) Big Four.

(6) Minnesota No. 6.

(7) C. I. 162, American Triumph.

(8) C. I. 163, American Beauty.

(9) Silver Mine.

(10) Regenerated Abundance.

(11) S. D. 116, C. I. 160, Banner.

(12) S. D. 161, C. I. 151, Lincoln.

(13) C. I. 158, Holstein Prolific.

(b) Side oats, Panicles one-sided.

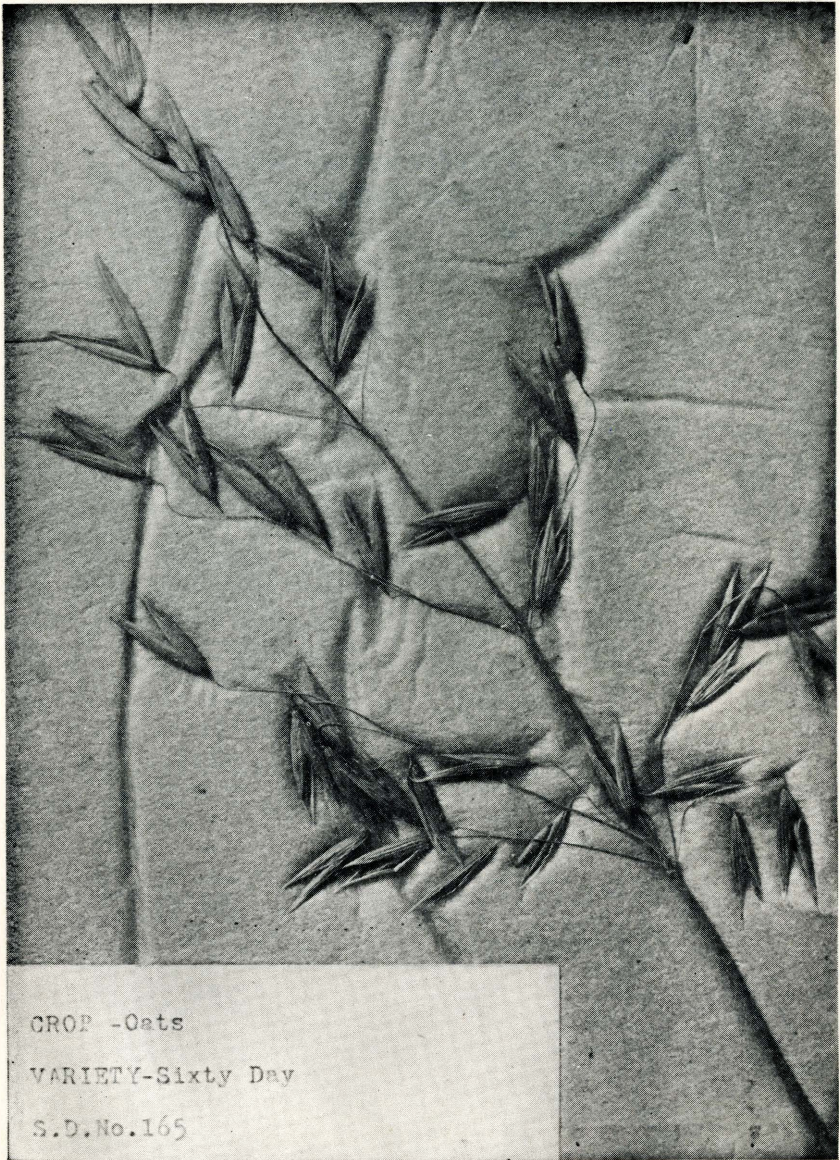
(1) White Russian.

C—Late.

(a) Spreading—Panicles not one-sided.

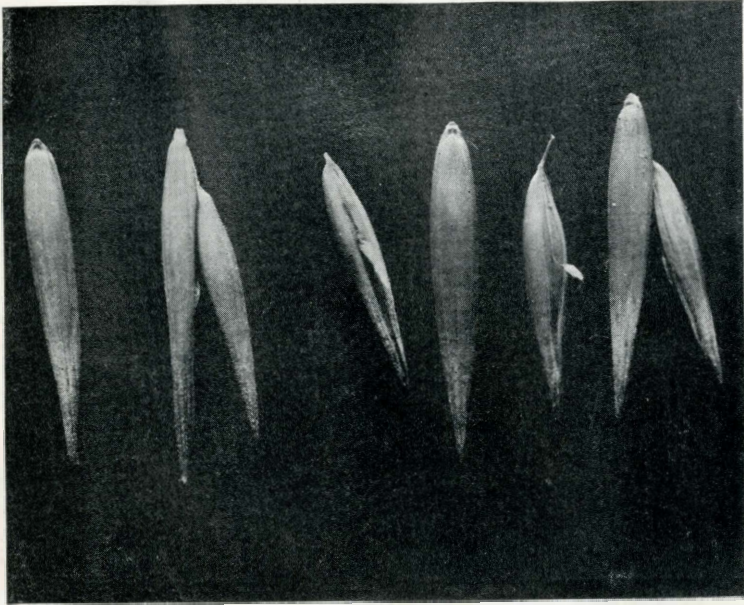
(b) Side oats—Panicles distinctly one-sided.

(1) Wide-Awake.



Sixty-day Oats.

A typical white, early spring variety for South Dakota—Straw medium and short. Botanically, the same as Kherson oats. Considerable lack of uniformity in this variety, as generally grown, is due to its not being a pedigreed variety.



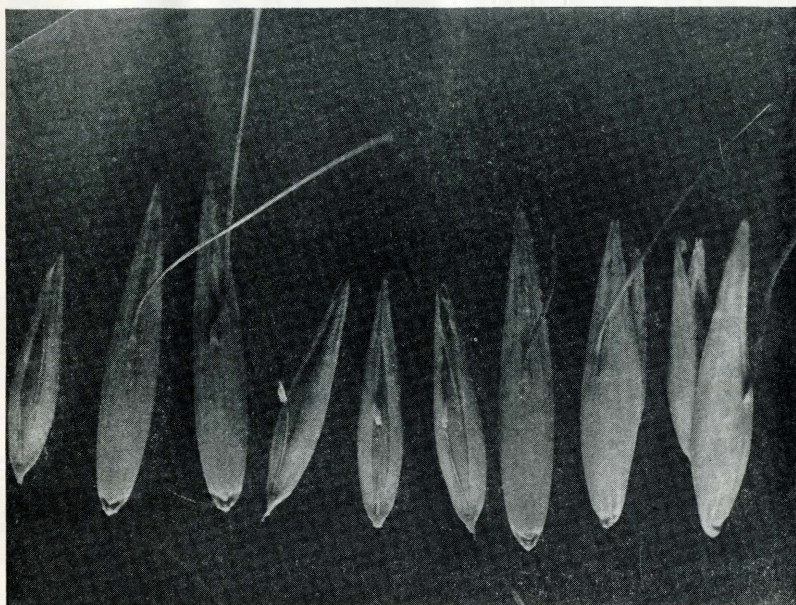
Grains of Sixty-Day.

The grains of Sixty-day oats appear small in size as would be expected in an early variety. They are tapering, pointed, but mainly without awns (beards). Color is a yellowish-white somewhat objectionable to the market. So far as chemical analyses are available, however, Sixty-day grain is high in percentage of kernel, and protein, and weight per bushel.



Swedish Select.

A typical white, medium oat for South Dakota. Straw taller than that of Sixty-day. This variety and Belyak are botanically identical, though the two strains were introduced from different sources.



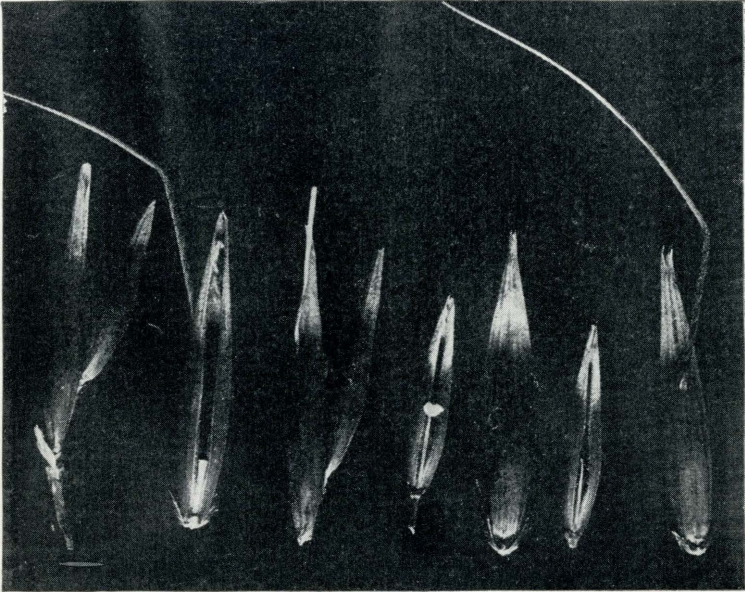
Grains of Swedish Select.

These grains are plump and medium pointed. As may be seen in the photograph one of the characteristics is the heavy twisted awn usually appearing on the back of the glume (chaff) of the lower grain. Quality of grain in Swedish Select, in all respects, is apparently good, though not better than Sixty-day.



North Finnish Black.

The grain of these oats is black, hence the name. The straw is stiff. The outer glumes tend to open widely as the ripening period approaches. Straw is stiff and resistant to lodging.



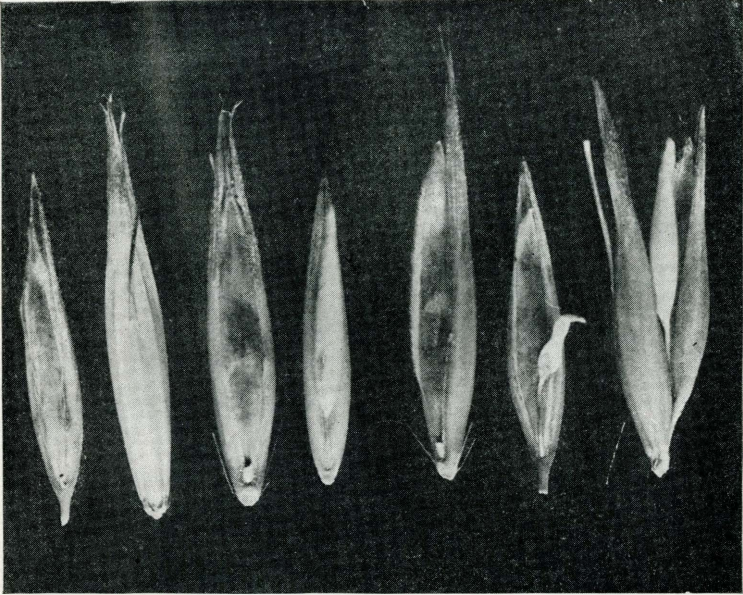
Grains of North Finnish Black.

It is easily understood why these oats are called black. That is what they mainly are. The tips of the glumes (chaff) however, are white as may be seen. Note the heavy twisted awns attached to the back of the flowering glume.



Red Algerian.

The name of this variety indicates the red color of the grain, namely, red to brown. The grains are long and slender and the outer glumes (chaff) also possess the same quality, to a noticeable degree.



Grains of Red Algerian.

The grain of Red Algerian takes a part of its name from the color. Extraordinary length of glume (chaff) and abundance of hairs on the glumes is also one of the characteristics. Occasionally the glumes possess awns, as will be noted in the photograph.



Tartarian Oats.

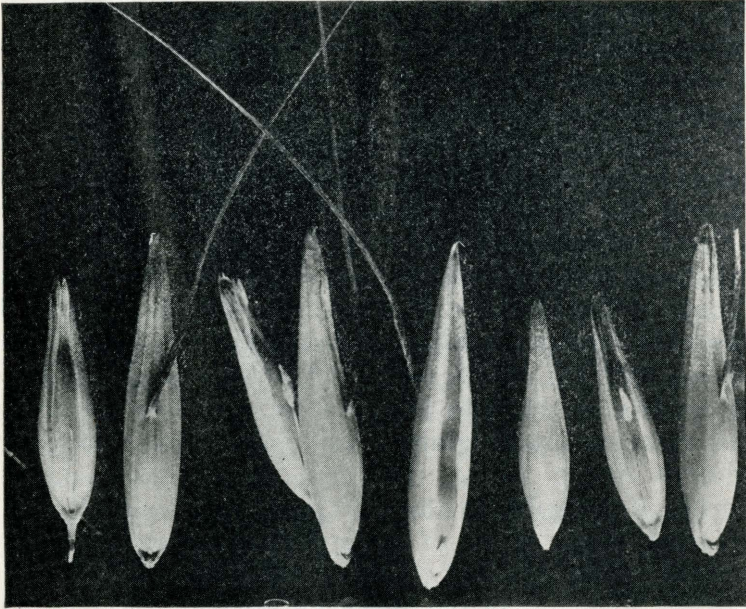
This variety serves as an illustration of Side Oats.

The spikelets are so set upon the rachis or stem that the florets group together on one side. Side-oats are sometimes called "rooster-tailed oats", due to this peculiar shape of the panicle. Between side-oats and panicle oats one finds all degrees of variation.



Banner Oats.

This is a typical white, spreading variety. It is very commonly grown throughout South Dakota, and the oat-growing section of the United States.



Grains of Banner Oats

Banner oats is a white variety. As will be noted the glumes frequently possess awns (beards). The market quality of the grain may be called average. The original stock of Banner oats, grown at the South Dakota Experiment Station, was secured previous to 1906 from the Canadian Experiment Station at Indian Head. In 1911, at Brookings, a new stock of seed was secured and the new stock secured under the name Banner is not botanically identical with the old.

Typical Banner oat grains are frequently awned but the awns (beards) are not so heavy as e.g. those of Swedish Select.

EARLY CHAMPION.

Description: No photograph is included in this Bulletin of Early Champion oats. The following quotation from a letter to the writers, written by Mr. C. W. Warburton, of the office of Cereal Investigations of the United States Department of Agriculture, furnishes a description of the variety:

“Culms rather few, coarse, 80 to 100 cm high; nodes usually 5, the last internode longer than the sum of the others; leaves about 25 to 30 cm. long, 12 to 15 mm. wide; panicles about 12 to 18 cm. long; exertion (distance from last leaf to base of panicle) less than the length of the panicle; whorls of the panicle usually 4; branches mostly ascending, forming angles of 45 degrees or less with the rachis, stiff. The larger panicles usually contain about 40 to 55 spikelets, with two kernels to the spikelet; empty glumes yellowish-white; flowering glumes about 13 to 15 mm. long, the smaller kernel of the spikelet about 10 to 12 mm. long. Kernels broader than those of Sixty-day and more frequently awned. Awn attached near the top of the kernel, only slightly longer than the flowering glume. Kernels light straw or a yellowish white in color, usually plump and of high weight per bushel. The variety matures at about the same time as Sixty-day.”

YIELDS PER ACRE OF SEVERAL VARIETIES AND STRAINS OF OATS.

The South Dakota Experiment Station has conducted field tests of oats varieties at four points within the State. The tests that have covered the greatest number of years and are, therefore, most complete, have been conducted at Brookings and at Highmore.

At Brookings, throughout the years 1906-1912, inclusive, yields have been recorded, with occasional interruptions, each year, for ten separate leading varieties. Other varieties and strains have been included in tests within this period which, due to evident lack of adaptation of the varieties, or for other reasons, were discontinued.

The following table is a compilation of these average yields, secured from such more successful strains at Brookings.

TABLE I.

Average Yields in Bushels per Acre, of Varieties and
Strains of Oats—Brookings Field
Years, 1906-1912.

Variety or Strain	S. D. No.	C. L. No.	Average yield in Bu. per acre for year:								Av. 1906 to 1911	Av. 1906 to 1912
			1906	1907	1908	1909	1910	1911	1912			
Sixty-day	165	165	61.6	24.7	59.2	46.7	28.7	19.4	64.0	40.1	43.5	
Swedish Select	112	134	61.6	24.1	25.0	44.0	29.0	4.7	86.0	31.4	39.2	
North Finnish Black	174	174		45.4	20.6	28.6	28.4	10.9	73.1	*26.8	†34.5	
Lincoln	161	151	42.2	14.1	17.6	33.0	29.4	8.0	86.5	24.1	33.0	
Belyak	336	336	42.8	9.1	26.8	28.9	27.8	2.0	86.5	22.9	32.0	
American Triumph		162	45.5	10.9	4.3	31.4	26.5	1.6		20.0		
American Beauty		163	43.8	10.3	5.0	25.9	28.4	2.2		19.3		
Wideawake		154	35.0	11.9	12.5	29.7	25.3	0.9		19.2		
Banner	116	160	42.7	8.1	2.5	22.2	30.0	3.6	98.1	18.2	29.6	
White Tartar		445	32.3	6.3	10.4	25.8	26.6	1.9		17.2		

† Average of 1907-1912.

* Average of 1907-1911.

Before putting down any final conclusions which may be drawn from Table I, it is well to note one or two features that may not at first appear. In every single year of the seven reported, with one exception, Sixty-day oats produced practically as high or a higher yield per acre than Swedish Select, which produced the second highest average yield.

It is interesting to recall in this connection that Sixty-day Oats is preeminently an early variety. Swedish Select is a medium oat. It appears possible to find some connection between time of maturity and the yielding capacity of these two varieties.

A season of extremely short rainfall throughout the months January-June, was 1911. In that year the yield of Sixty-day oats was notably higher than that of Swedish Select. The season of 1908 was not one of extreme drought, but rather was one of heavy summer rainfall. It is apparently true that both extreme drought and abnormally high rainfall have more chances to reduce the yield of medium and late maturing varieties. This would accord with the observation of general farm practice. At Brookings field, the season of 1912 is remembered in detail by the writers as an especially favorable one for oats. The favorable conditions obtained not only in the earlier part of the season but the later rains of May, June and July, though plentiful, were well distributed. They did not beat down nor destroy small grain. In such a season as 1912, with long continued favorable conditions, it would be expected that a medium variety of small grain would yield the maximum of which it might be capable. Thus in such a favorable season, a medium variety would be expected to out yield an early variety.

Conclusions From Average Yields at Brookings Field.

The **highest** average yield of grain has been secured with **Sixty-day**, an early variety.

The **second highest** yield has been secured with **Swedish Select**, a medium variety.

The **third highest** yield was secured from **North Finnish Black**, an early variety of evidently poor color.

Trials of Oat Varieties From Highmore.

Table II following is a compilation of yields per acre of varieties and strains of oats from Highmore field extending over years 1906-1912 inclusive.

TABLE II.

Average Yields in Bushels per Acre of Varieties and Strains of Oats—Highmore Field, 1906-1912.

Variety or Strain	S. D. No.	C. I. No.	Average in Bushels per Acre for Year:							Average
			1906	1907	1908	1909	1910	1911	1912	
Swedish Select	112	134	65.0	30.3	30.3	36.6	25.0	0.00	0.00	26.7
Belyak	336	336	55.6	26.6	21.3	22.8	36.9	0.00	0.00	23.3
Kherson	115	539	69.7	28.8	39.0	21.9	10.0	0.00	0.00	24.2
Sixty-Day	165	165	43.3	31.6	47.5	28.8	9.4	0.00	0.00	22.9
Red Algerian	286	286	49.6	21.9	32.8	23.4	35.0	0.00	0.00	23.2
North Finnish Black	174	174	58.8	25.0	26.3	30.6	19.4	0.00	0.00	22.9
Banner	116	160	62.5	31.6		16.8	14.7	0.00	0.00	20.9
Lincoln	161	151	45.6	30.6	29.7	15.6	16.3	0.00	0.00	19.7
Holstein Prolific		158	48.8	26.3	22.5	17.8	16.6	0.00	0.00	18.3
Wideawake		154	42.5	24.7	28.9	10.6		0.00	0.00	
White Tartar		445	44.7	26.3	25.0	4.7		0.00	0.00	
Regenerated Swedish Select					27.0	20.0	11.6	0.00	0.00	

It is well to note carefully the yields of the several varieties for the separate years before attempting any general conclusion. From the last column of averages of Table II, the highest average yield is recorded for Swedish Select oats. However, only in one year of the separate years 1906-1912 inclusive, did Swedish Select produce the highest average yield of grain.

Such a fact is only mentioned here to emphasize that however much one might desire to make an infallible statement as to which is the highest average yielding variety of oats at Highmore, one would not be justified in doing so merely upon the basis of the figures of Table II.

It would seem probable that the most productive varieties for Highmore conditions are:

Swedish Select } Botanically the same
Belyak }

Kherson } Botanically the same
Sixty-day }

Red Algerian
North Finnish Black

One may compare the average yields of Tables I and II, and thus observe that the four highest yielding strains at Brookings are also among those yielding highest at Highmore. Thus recognizing the difference in soil and climate of the two localities, it seems not unreasonable to combine the averages of varieties tested at both Brookings and Highmore. This is done solely upon the basis of the fact that strains yielding highest at one station were also among the highest at the other.

The following Table III is made, therefore, by combining Table I and Table II.

TABLE III.

Average of Yields in Bushels per Acre at Brookings and Highmore.

Variety or Strain	S. D. NO.	C. I. NO.	Average yeilds in Bu. per acre:								Aver- age
			1906	1907	1908	1909	1910	1911	1912		
Sixty-Day	165	165	59.1	27.4	51.2	36.0	19.2	9.7	32.0	33.5	
Kherson	115	539									
Swedish Select	12	134	63.3	27.2	27.6	40.3	27.0	2.4	43.0	33.0	
North Finn- ish Black	174	174	*58.8	35.2	23.4	29.6	23.9	5.4	36.5	30.4	
Belyak	336	336	49.2	17.8	24.1	25.8	32.3	1.0	43.2	27.6	
Lincoln	161	151	43.9	22.3	23.6	24.3	22.8	4.0	43.2	26.3	
Banner	116	160	52.6	19.8	2.5	19.5	22.4	1.8	49.1	23.9	

* Yield from Highmore only.

Deductions from Table III.

The last column of Table III presents in order the average yields of plots of several varieties at Brookings and Highmore for years 1906-1912 inclusive. A careful

examination of the yields for the separate years makes it evident that these general averages must not be taken too literally.

For instance the highest general average yield is recorded for Sixty-day Oats. In seven separate years, however, Sixty-Day made distinctly the highest yield in two instances. In the other five years of the seven, some other variety equaled or excelled it.

It is worth while at this point to use the present average yields of Table III as an illustration that facts for agriculture are not rapidly worked out. Instance, these seven years of variety tests of oats from Highmore, combined with seven years from Brookings. It needs no mathematical computation to establish that the figures of Table III are an approximation rather than a demonstration.

Accordingly, the evidence at hand is an indication that the following varieties of oats are among the most productive for eastern South Dakota. At present they may best be named in the order of Table III as follows:

Sixty-day, Swedish Select, North Finnish Black, Belyak, Lincoln, Banner.

It is to state further that North Finnish Black although ranking next to Sixty-day and Swedish Select, need not be especially recommended. It not only has a poor color, but the strain shatters badly.

Sixty-Day and **Swedish Select** are apparently to be preferred not only on account of yield, but on account of other qualities for eastern South Dakota.

Tests at Eureka and Cottonwood Fields.

Following Table IV, is comprised of yields secured from tests made at Eureka and Cottonwood. It will be observed that they cover a four-year period, one of the years having resulted in crop failure due to drought.

TABLE IV.**EUREKA**

Variety or Strain	S. D.	G. I.	Yield in Bushels Per Acre.				Aver- age
	NO.	NO.	1909	1910	1911	1912	
Swedish Select	112	134	43.7	25.0	0.00	4.7	18.4
Sixty-Day	165	165	37.2	20.2	0.00	6.1	15.9

COTTONWOOD.

Sixty-Day	165	165	12.5	4.4	0.00	25.9	10.7
Swedish Select	112	134	7.2	6.3	0.00	16.6	7.5

HISTORICAL.

“During eight years North Dakota Station has found an average variety variation of from 88 to 102 days, while the extreme limits due to both season and variety were 80 to 118 days”. (North Dakota Bulletin 52).

Sixty-Day (S. D. 165)

Sixty-day oats was introduced into the United States from Proskurov, Russia in 1901 by the United States Department of Agriculture. It has become the leading early variety in South Dakota. Among the first growers and distributors of the variety in South Dakota was Mr. Isaac Lincoln of Aberdeen. This led to the naming of the variety Lincoln Oats in some localities. Obviously the local naming should not lead to confusing this variety with Lincoln Oats discussed earlier in this Bulletin.

Kherson Oats (S. D. 115)

Introduced into Nebraska in 1897 from the Kherson, government of Russia, by Nebraska Experiment Station. On account of its habits of growth the oat is reported as peculiarly adapted to Central and Western Nebraska. In 1902 in Nebraska, when Swedish Select oats lodged so badly as to make it impossible to determine yield, Kherson oats, though partly lodged, yielded 52 bushels per acre. Sixty-day, partly shelled and yielded only 30 bushels per acre (Nebraska Bulletin 82).

Swedish Select (S. D. 134)

This variety was introduced from St. Petersburg, Russia by the United States Department, Office Cereal Investigations in 1899. It originated in Sweden, and was introduced into Russia through Finland. High yields are reported from this oats in many parts of the United States.

North Finnish Black.

The Bureau of Plant Industry of the United States Department of Agriculture, introduced the above named

oats into the United States. It was brought from Tornea, Finland, and is a standard variety of that region.

Red Algerian (S. D. 286)

Obtained from Dr. L. Trabut, Algiers, Algeria, in 1903. In early growth it inclines to be slow and spreading with uneven germination. Drought resistance is a quality generally claimed for it.

Belyak (S. D. 336)

Obtained from Moscow, Russia, in 1904, having come originally from Svaloff Experiment Station in Sweden. It is botanically the same as the Swedish Select, having been selected at the same Experiment Station as the former. Belyak and Swedish Select are apparently strains of the same variety.

Early Champion.

Early Champion oats has been and is still, one of the most commonly grown early varieties in the country. It may never be possible to determine the history from official records. In a letter to the writers from Mr. C. W. Warburton, of the Office of Cereal Investigations, the following is written:

“A grain dealer and farmer at Ames, Iowa, claims to have introduced the variety, (Early Champion). He claims that some twenty or twenty-five years ago he purchased some oats called Fourth of July from a dealer, and sowed them on his farm near Ames. These oats proved to be early and prolific, and according to Mr. Fowler quite different from anything he had previously seen. The next year he cleaned the seed thoroughly, sowed a large acreage and put the resulting crop on the market as the Early Champion oat. The Champion portion of the name he says, was suggested by the fact that the crop was cut with a Champion Binder.

In our tests at Ames this variety yielded very much less than Sixty-Day and has shown itself to be remarkably susceptible to smut. I do not consider it anywhere near as valuable as Sixty-Day or Kherson.”

Varieties of Oats. “Twenty-eight stations have tested varieties of oats from one to fifteen years and have obtained satisfactory results with 125 different varieties. Of these varieties only sixteen are recommended by four or more stations. Of the fourteen spring varieties, eleven are white with open panicles, as follows: American Banner, 10*; Badger Queen, 6; Lincoln, 5; Wideawake, 5; Improved American, 4; Clydesdale, 4; White Bonanza, 4; Prigles Progress, 4; Siberian, 4; Welcome, 4; White Wonder, 4. Two varieties with closed panicles, White Russian, 4, and Black Russian, 4. (Hunt—“The Cereals in America”). *Number of Stations recommending the variety.

Crossing—The indications are that oats are nearly always self-fertilized. No American cross-bred variety of oats has as yet been widely distributed. (Hunt—The Cereals in America).



RAINFALL AT THE SEVERAL STATIONS

	Brookings								Cottonwood			Eureka				Highmore				
	1905	1906	1907	1908	1909	1910	1911	1912	1910	1911	1912	1909	1910	1911	1912	1908	1909	1910	1911	1912
Jan.	0.22	0.17	1.06	0.20	1.20	1.07	0.61	0.28	0.66	T	0.17	0.10	0.60	0.50	0.25	T	0.26	0.82	0.11	0.13
Feb.	1.00	0.02	0.28	1.80	1.57	0.40	0.53	0.24	0.97	0.15	0.05	0.45	1.70	0.73	0.40	0.53	0.34	0.19	0.39	0.11
Mch.	0.68	0.58	0.55	1.16	0.37	0.35	0.53	0.26	0.76	T	3.00	0.14	1.23	0.62	1.05	0.00	0.13	0.58	2.54	0.27
Apr.	1.01	1.40	1.67	2.10	1.16	2.34	1.62	3.36	1.06	0.85	3.32	0.50	0.82	2.24	1.29	1.35	0.30	1.40	0.32	1.05
May	6.14	3.51	2.36	6.46	4.85	0.87	1.90	6.98	2.54	1.10	1.18	2.65	0.42	0.97	3.37	2.68	4.72	0.94	2.31	2.20
June	6.09	4.89	5.65	6.35	2.29	1.85	3.78	2.09	1.30	0.64	0.95	3.35	3.80	1.29	1.50	5.78	1.69	3.74	0.09	1.31
July	0.98	1.86	3.77	4.69	2.44	1.68	3.32	2.52	1.11	0.59	2.42	2.21	0.53	0.43	2.19	2.49	1.81	0.85	2.69	1.44
Aug.	4.54	4.28	1.41	2.37	3.39	2.46	3.81	4.68	0.48	2.41	3.42	1.39	2.60	3.27	3.27	3.53	3.74	0.66	2.52	3.39
Sept.	2.16	5.13	1.28	3.89	1.67	0.96	3.08	1.61	0.82	3.59	1.30	1.25	3.65	1.15	1.43	0.62	1.70	0.89	3.06	0.71
Oct.	1.50	3.01	0.96	1.43	1.71	0.38	5.12	0.96	0.32	1.15	0.11	0.17	0.18	0.61	0.07	2.19	1.04	0.24	1.05	0.20
Nov.	2.45	0.89	0.10	1.30	0.65	0.17	0.23	0.00	0.53	0.20	T	0.60	T	0.88	T	1.39	0.71	1.40	0.35	0.00
Dec.	T	0.52	1.12	0.42	1.14	0.10	0.42	0.20	3.00	0.42	0.12	2.40	0.25	0.80	0.11	0.31	1.41	0.44	0.44	0.35
Total	22.77	26.26	20.21	32.17	22.44	12.63	24.95	23.18	12.65	11.10	16.04	15.21	15.78	13.79	14.93	20.87	17.85	9.05	15.87	12.00

AVAILABLE BULLETINS

96. Forage Plants and Cereals at Highmore Sub-Station.
97. Speltz and Millet for the Production of Baby Beef.
98. Crop Rotation.
99. Macaroni and Durum Wheats. A continuation of Bulletin 92.
105. Stock Foods for Pigs.
106. Sugar Beets in South Dakota.
107. Sheep Scab.
108. New Hybrid Fruits.
109. Rusts of Cereals and other Plants.
110. Progress in Variety Tests of Oats.
111. A Study of South Dakota Butter with Suggestions for Improvement.
112. The Killing of Mustard and other Noxious Weeds in Grain Fields by the Use of Iron Sulphate.
113. Progress in Variety Tests of Barley.
114. Digestion Coefficients of Grain and Fodders for South Dakota.
115. Report of Work for 1907 and 1908 at Highmore Sub-Station.
116. Acidity of Creamery Butter and its Relation to Quality.
117. Sugar Beets in South Dakota.
121. Sugar Beets in South Dakota.
122. Creamery Butter.
123. Milk Powder Starters in Creameries.
124. Progress in Grain Investigations.
125. Fattening Steers of Different Ages.
126. Alkali Soils.
127. Breeding and Feeding Sheep.
128. Progress in Wheat Investigations.
129. Growing Pedigreed Sugar Beet Seed in South Dakota.
130. Some New Fruits.
131. Scabies (Mange) in Cattle.
132. Effects of Alkali Water on Dairy Products.
133. Alfalfa as a Field Crop in South Dakota.
134. More Winter Dairying in South Dakota.
135. Trials with Millets and Sorghums for Grain and Hay in South Dakota.
136. Fattening Pigs.
137. Wintering Steers.
138. Hog Cholera.
139. Soil and Crop and Their Relation to State Building.
140. Selection and Preparation of Seed Potatoes in the Season of 1912
141. Co-operative Tests of Alfalfa from Siberia and European Russia.
142. Sugar Beets in South Dakota—Results to Date.
143. Roughage for Fattening Lambs.
144. Preliminary Report on the Milking Machine.
145. A Report of Progress in Soil Fertility Investigations.
146. Some Varieties and Strains of Wheat and their Yields in South Dakota.
147. The Effect of Alkali Water on Dairy Cows.
148. Corn Silage and Mill Products for Steers.