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Report of Investigations at The Highmore Station for 1903

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SOUTH DAKOTA

AGRICULTURAL COLLEGE

EXPERIMENT STATION

BROOKINGS, SOUTH DAKOTA.

**Report of Investigations at
The Highmore Station for 1903.**

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Any farmer of the state can have the Bulletins of this Station free upon application to the Director.

REPORT OF INVESTIGATIONS AT THE HIGH-MORE STATION FOR 1903.

W. A. Wheeler.

The work of testing grasses and other forage plants at Highmore during the season of 1903 was carried on by Mr. Sylvester Balz under the direction of Professor De Alton Saunders. The following report of the work has been prepared from the data furnished by Mr. Balz at the close of the season's work. Professor Saunders severed his connection with the South Dakota Agricultural College in October, 1903.

There being more land at the station than necessary to carry on the tests of forage plants, a part of it was used by Professor Chilcott and Mr. Cole in testing macaroni wheats and other grains in co-operation with the United States Department of Agriculture. Their report forms the latter part of this bulletin.

The following table gives the amount of precipitation for each month of the year, and the departure from normal as recorded by Mr. S. Drew for the United States Weather Bureau:

Month.	Precipitation.	Departure From Normal.
January . . . . .	.05	— .12
February . . . . .	.30	+ .14
March . . . . .	.87	— .40
April . . . . .	.70	— 1.36
May . . . . .	.85	— .81
June	2.93	— .85
July	3.58	+ 1.12
August	2.40	+ .34
September	1.46	— .05
October66	— .07

November65	+ .29
December63	+ .30
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	15.08	-1.47

GRASSES.

In 1899, when the station at Highmore was first established, a series of thirty one-fourth acre plots was planted to grasses and clovers. During the years of 1901 and 1902 several others were also planted. All of those sown in 1899, and many of those sown in 1901 and 1902, had become so overrun with squirrel-tail grass, or wild barley, that no results could be obtained from them in 1903. All such plots were mowed and burned and plowed in the fall of 1903.

New plots of *Bromus marginatus*, *Elymus virginicus* and *Elymus canadensis* were started in the spring of 1903 and have become well established. These will probably give results later. Several plots were sown to *Elymus triticoides*. No germination of this was obtained.

A series of two hundred small plots of grasses and clovers is to be started in the spring of 1904 in the endeavor to secure drought resistant species.

ALFALFA.

The yields of alfalfa appeared to vary with the height of the ground. All on low ground yielded well. That on high ground was poor. Plots B4 and 5 are lower than the surrounding prairie. From plot B5 to B9 the ground gradually rises. The difference in the yields between the low and high ground plots is very apparent from the following data:

FRENCH ALFALFA SOWN IN 1900. PLOT B4a. ONE-EIGHTH ACRE.

First cutting in 1903, June 27. 1,792 pounds per acre.

Second cutting August 9. 616 pounds per acre.

Total yield per acre, one ton, 408 pounds.

SAMARKAND ALFALFA SOWN IN 1900. PLOT B4b. ONE-EIGHTH ACRE.

First cutting in 1903, June 27. 1,802 pounds per acre.

Second cutting on August 9. 1,840 pounds per acre.

Total yield per acre, on ton, 1,642 pounds.

TURKESTAN ALFALFA SOWN IN 1899. PLOT B5. ONE-FOURTH
ACRE.

First cutting in 1903, June 27. 2,080 pounds per acre.

Second cutting in 1903, August 9. 980 pounds per acre.

Total yield per acre, one ton, 1,060 pounds.

TURKESTAN ALFALFA SOWN IN 1899. PLOT B6. ONE-FOURTH
ACRE.

First cutting in 1903, June 25. 1,048 pounds per acre.

Second cutting in 1903, August 9. 328 pounds per acre.

Total yield per acre, 1,376 pounds.

TURKESTAN ALFALFA SOWN IN 1899. PLOTS B8 AND 9. ONE-
HALF ACRE.

First cutting in 1903, June 25. 276 pounds per acre.

Second cutting in 1903, August 9. 322 pounds per acre.

Total yield per acre, 598 pounds.

TURKESTAN ALFALFA SOWN IN 1899. PLOTS B19 AND 20. ONE-
HALF ACRE.

First cutting in 1903, June 29. 648 pounds per acre.

Second cutting in 1903, August 12. 282 pounds per acre.

Total yield per acre, 930 pounds.

MILLETS.

JAPANESE BARNYARD MILLET. ONETENTH ACRE PLOT.

Seed obtained from J. A. Salzer Seed Co. under the name of Billion Dollar Grass. Sown in drills June 4 at the rate of one-half bushel, or twenty-four pounds, to the acre. Height three feet ten inches.

Yield of hay per acre, 2 tons, 180 pounds.

KURSK MILLET. ONE-TENTH ACRE PLOT.

Sown June 5. Height, 2 feet 7 inches.

Cut with binder for hay on August 20.

Yield of hay per acre, 2 tons 360 pounds.

KURSK MILLET. ONE-TENTH ACRE PLOT.

Sown June 5. Height, 2 feet 9 inches.

Cut for both grain and hay.

Yield of grain per acre, 20 bushels 20 pounds.

Yield of hay per acre, 2½ tons.

SIBERIAN MILLET. ONE-TENTH ACRE PLOT.

Sown June 5. Height, 2 feet 10 inches.

Yield of hay per acre, 2 tons 1,410 pounds.

RED ORENBURG MILLET NO. 2960. ONE-TENTH ACRE PLOT.

Sown June 5 in drills 16 inches apart. Height, 2 feet 4 inches.

Cut with binder for grain and hay August 20.

Yield of grain per acre, 22 bushels 38 pounds.

Yield of hay per acre, 2 tons 816 pounds.

RED RUSSIAN MILLET NO. 2797. ONE-TENTH ACRE PLOT.

Sown June 5 in drills 16 inches apart. Height, 2 feet 6 inches.

Cut with binder for grain and hay August 20.

Yield of grain per acre, 22 bushels 10 pounds.

Yield of hay per acre, 1 ton 1,250 pounds.

SORGHUMS.

AMBER CANE. ONE-TENTH ACRE PLOT.

Sown May 23 in drills 36 inches apart.

Height, 7 feet 7 inches. Cut September 5.

Yield of cured cane per acre, 5 tons 30 pounds.

WISCONSIN EARLY AMBER CANE. ONE-TENTH ACRE PLOT.

Sown May 23 in drills 36 inches apart.

Height, 7 feet 2 inches. Cut September 4.

Yield of cured cane per acre, 5 tons 160 pounds.

BRANCHING BOURA. ONE-TENTH ACRE PLOT.

Sown May 23 in drills 36 inches apart.

Height, 4 feet 6 inches. Cut September 8.

Yield of cured fodder per acre, 2 tons 1,370 pounds.

JERUSALEM CORN. THREETENTHS ACRE PLOT.

Sown May 19. Cut September 9.

Yield of cured fodder per acre, 2 tons 197 pounds.

EARLIEST KAFFIR CORN. ONE-TENTH ACRE PLOT.

Sown May 29 in drills 36 inches apart.

Height, 5 feet 2 inches. Cut September 4.

Yield of cured fodder per acre, 4 tons 430 pounds.

KAFFIR CORN. ONE-FIFTH ACRE PLOT.

Sown May 29 in drills 36 inches apart.

Height, 4 feet 8 inches. Cut September 4.

Yield of cured fodder per acre, 3 tons 520 pounds.

MILO MAIZE. ONE-FIFTH ACRE PLOT.

Sown May 18 in drills.

Height, 5 feet 4 inches. Cut September 9.

Yield of cured fodder per acre, 2 tons, 1,650 pounds.

TEOSINTE. ONE-TENTH ACRE PLOT.

Sown May 29 in drills 30 inches apart, and 24 inches apart in the rows.

Height, 3 feet 5 inches. Cut September 11.

Yield of cured fodder per acre, 2 tons, 340 pounds.

CORN.

EARLY HURON DENT CORN. ONE-TENTH ACRE PLOT.

Planted May 15. Height, 7 feet 4 inches.

Eighty-five per cent ripened.

Yield per acre, 18 bushels 20 pounds.

YELLOW DENT CORN. THREE AND THREE-FOURTHS ACRES.

Planted June 2. Height, 5 feet 10 inches.

Yield per acre, 21 bushels.

SQUAW CORN. ONE AND ONE-HALF ACRES.

Planted May 25. Height, 4 feet 8 inches.

Yield per acre 23 1-3 bushels.

QUEEN OF THE NORTH CORN. ONE-TENTH ACRE PLOT.

Planted May 15. Height, 6 feet 6 inches.

Ripened, about one-third of crop.

KING OF THE EARLIEST CORN. ONE-TENTH ACRE PLOT.

Planted May 15. Height, 6 feet 4 inches.

Ripened about same as Queen of the North.

RIED'S YELLOW DENT CORN. ONE-TENTH ACRE PLOT.

Planted May 15. Height, 7 feet 4 inches.

Ripened about one-fourth of crop.

IOWA GOLD MINE CORN. ONE-TENTH ACRE PLOT.

Planted May 15. Height, 7 feet 2 inches.

Did not ripen.

EARLY GIANT WHITE CORN. ONETENTH ACRE PLOT.

Planted May 15. Height, 6 feet 10 inches.

Did not ripen.

WISCONSIN WHITE DENT CORN. ONE-TENTH ACRE PLOT.

Planted May 15. Height, 6 feet 8 inches.

Did not ripen.

RILEY'S FAVORITE CORN. ONE-TENTH ACRE PLOT.

Planted May 15. Height, 6 feet 10 inches.

Did not ripen.

SUPERIOR FODDER CORN. ONE-TENTH ACRE PLOT.

Sown May 30 in drills 36 inches apart.

Height, 7 feet 8 inches. Cut August 28.

Yield of green fodder per acre, 23 tons 760 pounds.

Yield of cured fodder per acre, 7 tons 1,480 pounds.

RAPE.

DWARF ESSEX RAPE. ONE-TENTH ACRE PLOT.

Sown May 23 in drills 16 inches apart.

Yield of green fodder per acre, 4 tons 1,620 pounds.

DWARF VICTORIA RAPE. ONE-TENTH ACRE PLOT.

Sown May 28 in drills 16 inches apart.

Yield of green fodder per acre, 3¼ tons.

KALE.

THOUSAND-HEADED KALE. ONE-TENTH ACRE PLOT.

Sown May 28 in drills 16 inches apart.

Yield of green fodder per acre, 6½ tons.

CO-OPERATIVE CEREAL INVESTIGATIONS AT HIGHMORE.

E. C. Chilcott, Collaborator.

J. S. Cole, Special Agent.

SUMMARY OF RESULTS FOR 1903.

John S. Cole.

In order to concentrate the work of the Experiment Station, it seemed advisable, in the spring of 1903, to move the work with small grains, which had been carried on at Mellette for two years in co-operation with the Bureau of Plant Industry of the United States Department of Agriculture, to the state sub-station at Highmore. Mr. Sylvester Balz continued in charge of the work.

Conditions in the early spring were favorable for a good start and vigorous growth of all kinds of grain. But, as noted in the introduction, the rainfall during April and May, and up to the 24th of June, was very light. Before the heavy rain on the latter date, small grains were in a very critical condition. Most varieties were heading very close to the ground, stools were quite generally killed, and some of the earliest varieties of barley were ripening prematurely. One effect of this dry weather in the early part of the growing season was to produce a small growth of straw, as is shown in the accompanying tables. Then, too, early varieties were so far advanced before the rain came that recovery with them was less complete than with late varieties.

The work consisted of tests of forty-seven varieties of macaroni wheat, two of bread wheat, two of cmmer, six of oats, and twenty-six of barley. All of these were varieties which had already shown themselves possessed of valuable qualities. In addition to the variety tests a considerable amount of work was done toward standardizing and improving the most important varieties, especially of macaroni wheat. Because of its peculiar characteristics and special uses, the importance of keeping this grain free from mixtures of all kinds cannot be too strongly empha-

sized.

In giving the accompanying tables, showing the results of the year's trial of the varieties under experiment, the object is to show what is being done, and something of the general results obtained. It is not intended by them to recommend certain varieties, or to condemn others, because they show the best or the poorest yields. We know that no reliable conclusions can be drawn from one year's trial in any one locality. A variety that heads the list in one experiment often fails to respond when grown on another soil, or to the climatic conditions of another season.

It will be seen from the tables that the yield of macaroni wheat ranged from nine bushels to over twenty bushels, with an average of 14.65 bushels per acre. While this is a little below the averages obtained in other years at other places, the quality of the grain was the best that has so far been obtained in our work with this wheat. Taken into consideration with other results and with personal observations made by the writer in an extended trip over the state during the harvest of 1903, it may be stated that the ability of macaroni wheat to stand drought is fully proven. Further than this, and what is not so generally understood, it does not reach its maximum development, especially in quality, in localities or seasons of heavy rainfall.

The two varieties of emmer, or speltz, grown gave yields of 23 and 20 bushels per acre, respectively.

Of the six varieties of oats, one was a total failure, the other five gave an average yield of $31\frac{1}{2}$ bushels. We feel justified in calling attention to the Swedish Select Oat, of which the yield was over 38 bushels per acre. This variety has been grown by the Experiment Station for a number of years, and distributed in considerable amount to the farmers of the state. The Sixty Day Oat, which has also been grown and distributed for several years, failed to come up to its usual standard, owing to the disadvantages placed by the season on early varieties, as shown in previous paragraphs.

●f the twenty-six varieties of barley, five were total failures; the yields of the other twenty-one ranged from 11.6 bushels to 27.5 bushels. The Minnesota No. 6, which gave the latter yield, was received from Minnesota Experiment Station in the spring of 1902. Professor W. M. Hays at that time had this to say of it: "Minnesota No. 6 (Wisconsin Mansury) was for years decidedly the best variety in our variety tests, and has been distributed into many counties, and called to the attention of seedsmen."

**YIELDS OF MACARONI WHEAT PER ACRE AT HIGHMORE
IN 1903.**

Number and Name.	Grain. Bu.	Straw. Lbs.
1354—Kubanka	12.83	1110
1516—Kubanka	10.66	810
1541—Kubanka	10.00	1070
5639—Kubanka	15.16	1210
8212—Kubanka	16.66	1160
8213—Kubanka	13.50	1090
1350—Pererodka	15.91	1200
1515—Pererodka	16.33	1100
1377—Realli Forte	16.00	1220
1428—Egyptian	18.83	1230
1431—Arnautka	19.33	1420
1537—Arnautka	16.16	1320
1481—Ble dur	16.50	1230
1483—Ble dur	18.50	1240
1509—Ble dur	16.00	1260
1510—Ble dur	17.16	1200
1492—Nicaragua	18.83	1410
1493—Wild Goose	17.83	1420
1508—Spring Wheat	16.50	1330
1513—Beloturka	14.00	1210

5800—Beloturka	12.00	1210
1540—Chernokoloska	12.83	1260
1546—Gharnovka	16.00	1300
5643—Gharnovka	15.50	1210
5646—Gharnovka	14.66	1190
5351—Berdiansk	15.83	1140
5352—Novo Rossisk	13.58	1050
5353—Algerian	13.66	1200
5354—Argentine	17.00	1360
5355—Taganrog	18.50	1530
5380—Pellissier	17.75	1510
7785—Pellissier	20.16	1890
5492—Medeah	12.00	1880
7579—Medeah	14.00	1820
5642—Yellow Gharnovka	18.66	1400
8230—Yellow Gharnovka	19.16	1480
5644—Velvet Don	18.83	1450
5645—Black Don	16.50	1260
8232—Black Don	11.66	930
7578—Marouni	11.66	810
7580—Adjini	10.66	760
7581—Kahla	11.33	860
7794—Kahla	9.00	740
7792—Mahmoudi	14.16	1110
7793—Mohamed	11.83	930
7795—Richi	12.00	920
9130—Saragolla	11.16	910
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Average	14.65	1220

Average number pounds straw to one of grain, 1.38.

YIELDS OF BARLEY PER ACRE AT HIGHMORE IN 1903.

Number and Name.	Grain.	Straw.
	Bu.	Lbs.
23—Chevalier	12.08	770
35—Chevalier	16.45	830
24—Hanna	19.37	900

26—Hanna	15.83	630
28—Hanna	15.62	790
30—Hanna	13.12	780
33—Hanna	12.29	780
5793—Hanna	14.37	760
27—Bohemian	16.45	940
32—Bohemian	18.33	920
29—Bestehorn Imperial	12.29	970
31—Horn	14.37	790
34—Hanna Pedigree	15.62	1050
39—Rokaku Chevalier	15.83	900
47—Striegum	15.62	910
48—Golden Melon	10.62	650
50—Tanikaze .....	.00	....
54—Santoku .....	.00	....
52—Shiro Nishiki .....	.00	....
62—Doitsu Harumaki	12.08	750
72—Cape .....	.00	....
7583—Beldi .....	.00	....
7969—White	16.45	1140
7970—Black	24.58	1460
Minnesota No. 6.....	27.50	1370
Minnesota No. 105.....	20.62	1130

*Average16.16 915

Average number pounds straw to one of grain 1.16.

*Does not include Nos. 50, 54, 52, 72 and 7583.

YIELD OF OATS PER ACRE AT HIGHMORE IN 1903.

Number and Name.	Grain. Bu.	Straw. Lbs.
4344—Black Hungarian	23.75	960
5059.....	00	....
5513—North Finnish	35.21	900
2800—Tobolsk	36.56	1050
2788—Swedish Select	38.12	990
5938—Sixty Day	24.06	600
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*Average	31.56	900

Average number pounds straw to one of grain 0.89.

*Does not include No. 5059.

YIELD OF EMMER OR SPELT AT HIGHMORE IN 1903.

Number and Name.	Grain. Bu.	Straw. Lbs.
1524.....	23.40	770
South Dakota No. 3.....	20.00	730
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Average	21.70	750

Average number pounds straw to one of grain 0.78.