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Bulletin No. 185 - Barley Tests at the Sheridan Field Station

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Harvesting Barley Varieties, Sheridan Field Station.

Barley Tests at the Sheridan Field Station

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Barley Tests at the Sheridan Field Station

BY
R. S. Towle, Superintendent
AND
R. M. Williams, Junior Agronomist

INTRODUCTION

This bulletin gives the results of tests with varieties of barley at the Sheridan Field Station, Sheridan, Wyoming.* Varietal experiments with small grains have been conducted at this station each year since it was established in 1916. The trials are conducted to determine the crop varieties best adapted for northeastern Wyoming.

The station is located on a non-irrigated tract of land about eight miles northeast of Sheridan. The land on which these experiments were conducted is mostly on a northeast slope. In a few cases the barley varieties were located on a south slope, but the land used is fairly uniform and is representative, generally, of the greater part of the dry-farmed land in this part of the state. The soil on the northeast slope is a dark, heavy clay loam with a small quantity of gumbo. The soil on the south slope is a sandy loam, somewhat lighter in color and contains practically no gumbo. The altitude of the station is 3,800 feet.

The rainfall at the station shows wide fluctuations both in quantity and in its distribution during the season. (See Table I.) The average annual precipitation from 1917 to 1931, inclusive, was 15.37 inches, with a range from 8.56 inches in 1919 to 25.18 inches in 1923. The seasonal rainfall, April 1 to August 31, ranged from 4.14 inches in 1919 to 15.50 inches in 1927, and for the fifteen years averaged 8.81 inches. Evaporation, as determined at the station, is considerably less than in other parts of the Great Plains. The temperature seldom reaches a maximum of 100° F. The wind velocity is relatively low compared with other sections of the Great Plains.

*This station is conducted cooperatively by the Division of Dry-Land Agriculture of the United States Department of Agriculture and the Division of State Experiment Farms, Agricultural College, University of Wyoming. The varietal experiments are conducted in cooperation with the Division of Cereal Crops and Diseases of the United States Department of Agriculture.
PLAN OF VARIETAL EXPERIMENTS WITH BARLEY

Throughout the entire period, each variety was grown in three systematically replicated plots in order to correct for differences caused by soil variation. Figure I shows the seeding order in 1931. Previous to 1921, one-twentieth-acre plots were used, but beginning with 1921 the size of the plots was reduced to one-fortieth of an acre.

In 1917 all crops on the station were grown on sod land broken in 1916. From 1918 to 1922 the varieties of barley followed corn, and from 1923 to 1931 they were on fallow.

Seed of all varieties was treated for covered smut each year, with the exception of one or two years during the first ten years of the experiment. The formaldehyde treatment was used for several years, but during the last few years one of the commercial mercury dusts has been used. At no time when the seed was treated was there any covered smut. No rust has appeared on any of the varieties at any time. All yields and seeding rates, including all varieties, are calculated on a basis of 48 pounds to the bushel.

### Table I.

Annual and seasonal (April 1 to August 31) rainfall in inches from 1917 to 1931, inclusive, Sheridan Field Station, Sheridan, Wyoming.

<table>
<thead>
<tr>
<th></th>
<th>1917</th>
<th>1918</th>
<th>1919</th>
<th>1920</th>
<th>1921</th>
<th>1922</th>
<th>1923</th>
<th>1924</th>
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<td>17.26</td>
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<td>10.61</td>
<td>17.85</td>
<td>25.18</td>
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<td>14.90</td>
<td>22.16</td>
<td>17.27</td>
<td>17.05</td>
<td>8.68</td>
<td>14.63</td>
<td>15.37</td>
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<td>7.27</td>
<td>15.50</td>
<td>10.21</td>
<td>8.22</td>
<td>5.20</td>
<td>6.04</td>
<td>8.81</td>
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</tbody>
</table>

A total of 17 varieties has been grown in the test, although not all of them were included in any one year. The test was started in 1917 with 8 varieties. Two more varieties were included in 1921, and Nepal, the one hull-less variety originally included, was dropped from the test until 1925. One variety was
added in 1924 and one in 1925. Two more varieties were added to the test in 1927. In 1929, 4 of the lowest yielding varieties were discarded, and 3 other varieties were included.

In some years supplementary experiments were conducted in which two or more varieties were compared. From 1928 to 1931 a few varieties were sown late in the spring on land that had grown a crop the year before. In three of the years the preceding crop was barley, and in one it was millet. The plots in all of these supplementary tests were replicated in the same manner as in the regular variety test.

**DISCUSSION OF YIELDS FROM VARIETAL EXPERIMENTS**

Table II shows the annual and average yield of each variety in the regular variety test for the years that it was grown. It also shows the average yield of Trebi for the period that each variety was grown and the average yield of each variety in percentage of the average yield of Trebi for such period.

Table II shows that Trebi, a six-rowed hulled barley, made the highest average yield of any of the varieties included in the test. For the time that the test has been conducted, Trebi ranked first in yield in 6 years, second in 4 years, third in 3 years, and sixth in 1 year when the yield of all varieties was very low. Taking the average yield of Trebi as 100 per cent, Coast, a six-rowed hulled barley, yielded 88.7 per cent, or 4.6 bushels per acre less for the 15 years, and Horn, a two-rowed hulled barley, yielded 88.5 per cent, or 5.6 bushels per acre less, for the 11 years that it was grown. These two varieties rank next highest to Trebi in average yields for the time they were grown. Coast yielded the highest of all the varieties in one year, and Horn in one year. Horn also out-yielded Trebi in a few instances in the miscellaneous seedings, but in most cases only by a small margin. In some years when the bushel weight of barley was low, Horn weighed heavier than Trebi. White Smyrna, a two-rowed hulled variety originally used on the station for general seeding, yielded only 78.5 per cent as much as Trebi, or 9.1 bushels per acre less, for the entire period that it was included in the test, although it ranked first in yield in two years.
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<td>33.1</td>
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<td>23.9</td>
<td>2.5</td>
<td>31.3</td>
<td>68.1</td>
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<td>68.9</td>
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<td>57.0</td>
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<td>85.9</td>
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<td>15.5</td>
<td>46.1</td>
<td>42.5</td>
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<td>55.8</td>
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<td>26.2</td>
<td>57.5</td>
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<td>44.4</td>
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<td>Vaughn</td>
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<td>Nepal</td>
<td>595</td>
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<td>0</td>
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<td>Faust</td>
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</tbody>
</table>

Table II.—Annual and average yields of varieties of barley at the Sheridan Field Station during the years specified from 1917 to 1931, inclusive.
Of the two beardless and hulled varieties tested, the average yield of Meloy was 83.1 per cent and that of Colsees 75.6 per cent of the yield of Trebi. Meloy out-yielded Colsees in four of the five years that both were grown. Velvet, a smooth-awned hulled variety included first in 1929, yielded comparatively low that year, and in the dry seasons of 1930 and 1931 it was one of the lowest yielders. Vaughn, a very early maturing variety with a smooth awn, yielded low in 1929 and lower than Trebi in 1930, but in 1931 it was the highest yielding variety. It also out-yielded both Trebi and Horn in 1930 in seedings outside the regular variety test, both on fallow and following another small grain. In 1931 it was the only variety in the late seeding following a small grain that made sufficient growth to harvest.

Nepal, a hull-less and beardless variety, and the only hull-less variety grown on the station for any length of time, yielded very low on corn ground in the first four years of the test. In the last six years, when grown on fallow, yields were better, but they were still low as compared with most of the hulled varieties. Faust, another beardless and hull-less variety, yielded less than Nepal in both years that it was grown. California Hull-less, a bearded and hull-less variety, yielded more than Nepal the first year it was grown, but yielded less in the next three years.

DATES AND RATES OF SEEDING BARLEY

Tests with dates and rates of seeding barley and other small grains were included among the experiments when the station was established. The tests with barley were discontinued in 1920 because of a lack of suitable land for that purpose. By 1926 the cropping plan of the station was rearranged so that the work could be included again. These tests were conducted in the same manner as the variety tests, on 3 systematically replicated plots for each seeding. One-twentieth-acre plots were used during the first years of the experiments, but from 1926 to 1931 one-fortieth-acre plots were used. White Smyrna (C. I. No. 195) was used in these tests from 1918 to 1920. Trebi (C. I. No. 936) was used from 1926 to 1931.
In the date-of-seeding test barley was sown each half-month from April 1, when it was possible to seed that early, to the middle of June. The late June seeding was discontinued after 1926, and another seeding was included between May 16 and June 1. Other seedings were added later. The first seeding in the spring usually was made as soon as field work was possible, generally in the vicinity of the station. In 1918 the first seeding was delayed until April 13, and the second was made on April 23. The first seeding was made on April 9 in 1920 and 1926, and on April 16 in 1929. In 1927 the second seeding was delayed until April 26.

Table III.—Annual and average yields of barley seeded at different dates and the yields from the first seeding and seedings made at stated intervals thereafter at the Sheridan Field Station during the years specified from 1918 to 1931, inclusive.

<table>
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<tr>
<th>DATE OR PERIOD OF SEEDING</th>
<th>1918</th>
<th>1919</th>
<th>1920</th>
<th>1926</th>
<th>1927</th>
<th>1928</th>
<th>1929</th>
<th>1930</th>
<th>1931</th>
<th>Ave.</th>
<th>Average Yield in Percentage of April 16 Seeding</th>
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<td>41.7</td>
<td>47.0</td>
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<td>34.1</td>
<td>100.3</td>
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<td>First Seeding</td>
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<td>26.4</td>
<td>20.0</td>
<td>3.3</td>
<td>33.2</td>
<td>100*</td>
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<td>15-24 days after†</td>
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<td>29.7</td>
<td>35.0</td>
<td>68.3</td>
<td>77.2</td>
<td>21.3</td>
<td>13.2</td>
<td>.8</td>
<td>30.5</td>
<td>91.9*</td>
</tr>
<tr>
<td>25-40 days after†</td>
<td>27.1</td>
<td>0</td>
<td>13.6</td>
<td>21.1</td>
<td>65.3</td>
<td>79.1</td>
<td>18.2</td>
<td>7.9</td>
<td>0</td>
<td>25.8</td>
<td>77.7*</td>
</tr>
<tr>
<td>41-56 days after†</td>
<td>20.1</td>
<td>0</td>
<td>8.6</td>
<td>9.1</td>
<td>64.9</td>
<td>57.5</td>
<td>11.1</td>
<td>5.7</td>
<td>0</td>
<td>19.7</td>
<td>59.3*</td>
</tr>
<tr>
<td>60-67 days after†</td>
<td>10.4</td>
<td>0</td>
<td>9.7</td>
<td>62.8</td>
<td>43.1</td>
<td>5.3</td>
<td></td>
<td></td>
<td></td>
<td>48.8*</td>
<td></td>
</tr>
</tbody>
</table>

Table III shows the yields obtained from each date of seeding from 1918 to 1931. Yields generally were smaller as the time of seeding was delayed. For seedings done from 10 to 15 days after field work became general, the decreases in yield were slight, and in some years the yield was greater than from the first seeding. Where the crop was sown within 15 to 25 days after the first seed-

*Average yield in percentage of first seeding.
†Where more than one seeding was made in any one period, yield shown is average of two seedings.
ing, the average decrease in yield for all years that the test was conducted was only about 8 per cent of the yield of the first seeding, and in a few years the yield was more than from the first seeding. The drop in yield was considerable, however, where the crop was sown later than about 30 days after field work became general, and yields grew steadily smaller as the time of seeding was delayed. In two years good yields were obtained from late seedings, but moisture conditions in those years were exceptionally good late in the season.

In general, results from this test indicate that to obtain the best yields, barley should be sown within the first month after field work becomes possible. Greatly reduced yields may be expected from later seeding.

In the rate-of-seeding test, barley was sown at rates ranging from 2 pecks to 8 pecks per acre. Table IV shows the yields obtained from several rates of seeding for the years the test was conducted. The 2-peck rate of seeding was discontinued after 1927. The yield from this rate was consistently low as compared with other rates except in 1927. In that year conditions for the crop were exceptionally good, and there was little difference in the stand from any of the different seeding rates. In general, the heavier seeding rates yielded slightly the highest, but the difference in yield from any of the rates from 3 to 8 pecks per acre usually was small, and in some years the lighter seeding, within that range, was best.

| Rate of Seeding Per Acre | 1917 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | Average |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| 2 pecks                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |
| 3 pecks                  | 10.0 | 28.8 | 0    | 20.0 | 41.7 | 66.9 |      |      |      |      | 64.7 | 33.1 | 16.7 | 2.5  | 30.1  |
| 4 pecks                  | 13.3 | 33.2 | 0    | 36.9 | 45.8 | 67.8 | 66.4 | 31.9 | 20.8 | 2.8  | 31.9 |      |      |      |      |       |
| 5 pecks                  | 13.3 | 33.2 | 0    | 34.7 | 42.8 | 72.2 | 75.8 | 30.6 | 25.0 | 4.2  | 32.9 |      |      |      |      |       |
| 6 pecks                  | 12.5 | 32.9 | 0    | 40.8 | 47.5 | 66.0 | 82.6 | 32.5 | 28.9 | 3.1  | 34.7 |      |      |      |      |       |
| 7 pecks                  | 7.0  | 31.1 | 0    | 41.1 | 48.6 | 66.7 | 81.4 | 33.3 | 29.1 | 2.2  | 34.1 |      |      |      |      |       |
| 8 pecks                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |
CONCLUSIONS

Trebi produced the highest yields of any of the varieties of barley that have been tested on the station. The average was 40.8 bushels per acre over the period 1917-1931. Coast yielded 4.6 bushels per acre less than Trebi, and Horn 5.6 bushels less than Trebi, over the period that each was grown. In some of the miscellaneous seedings Horn yielded slightly better than Trebi. Of the beardless and hulled varieties grown, Meloy yielded more than Colsess, but yields of that variety were less than those of the best yielding bearded and hulled varieties. All hull-less varieties yielded low. Vaughn, a smooth-awned variety, compared very well with Trebi in the two dry years of 1930 and 1931, but it did not do so well in the more nearly normal year of 1929. Velvet yielded low every year it was grown.

Barley should be sown within the first month after field work becomes possible. Greatly reduced yields may be expected from later seeding.

A seeding rate of 2 pecks of barley per acre is too light. The differences in the yield of barley from seedings made at rates ranging from 3 to 8 pecks per acre generally are small. Some years the lighter seeding within that range is best.

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ANNUAL REPORTS—
12th to 40th, inclusive (1901-2 to 1928-31, inclusive).

INDEX BULLETINS—
C, D and E.

HORTICULTURAL BULLETINS—
Special Bulletins, Volume I, Nos. 3 and 6, inclusive.
Biennial Reports, Third to Seventh, inclusive.

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