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UNIVERSITY OF WYOMING
AGRICULTURAL EXPERIMENT STATION

CORN PRODUCTION
ON THE CAMPBELL COUNTY EXPERIMENT FARM

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The ability of corn to withstand drought and produce a crop in dry years when small grains fail makes it a valuable crop for the dry farm. During the ten years that corn has been grown on the experiment farm near Gillette in Campbell County, there has not been a total failure. In this period experiments were conducted in order to determine the varieties of corn best suited to northeastern Wyoming under dry-farming conditions, and also the effect of various methods of seed-bed preparation and planting.

Climate

The climate at the experiment farm is characteristic of much of northeastern Wyoming. Temperatures are quite variable. During the growing season the days are hot and the nights are usually cool. Weather data, taken in Gillette, two miles west of the station, show that the average date of the last killing frost in the spring is May 17, and the first killing frost in the fall is September 27.¹

On the experiment farm there has been a light frost nearly every year in the last part of August. In three years out of five this frost injured corn on low land.

The average annual rainfall for the 12 years, 1925-1936, is 13.15 inches. More than sixty per cent of this comes during the months of April, May, and June.

Soil

The soil on the farm where these experiments were made varies from a medium clay loam to a brown, sandy loam and is typical of much of the farming land in northeastern Wyoming. It is rich in mineral matter, but low in humus. The soil is easily

worked, and with the use of suitable dry-land methods for moisture conservation it produces good crops in average years. The fields where the corn was grown in these tests are rolling in topography and slope in no general direction.

Plats Used in the Experiment

The plats were one-eleventh acre in size, measuring 132 feet long by 30 feet wide. There were alleys four feet wide between the plats and roadways twenty feet wide between the series of plats or fields. The corn rows were planted lengthwise of the plats or approximately north and south.

Equipment Used

Regular farm machinery, consisting of a general purpose plow, a four-horse disk, a spike-tooth harrow, a two-row corn planter, a one-row lister, and a one-row cultivator were used in preparing the seed bed, planting and cultivating the corn. For furrow planting, disk furrow openers were attached to the corn planter shoe. In cultivating the corn, duckfoot shovels were used. These kept down weeds and left a rough mulch.

Testing Corn Varieties

Tests of different varieties of corn for hardiness and yield continued from 1927 to 1936, inclusive. For these tests varieties were used that seemed adapted. Falconer, a yellow semi-dent corn, and a white dent corn, known locally as "white dent," were grown continuously for ten years. These two varieties proved hardy and yielded well. Gehu, a yellow flint corn, was also a good yielder. Minnesota 23, a white-cap yellow dent corn, proved hardy but did not give as high yields as the white dent. Black Hills Yellow Dent, which has been on test during the last six years, 1931-1936, inclusive, averaged higher in yield than the white dent for that period. Minnesota 13, which was grown for four years, did not yield as well as other varieties. Golden Glo, another yellow dent corn, grown in 1929 and 1930, gave favorable yields but did not mature satisfactorily. Pioneer White Dent and Square Deal Yellow Dent, grown only in 1936, compared favorably with other white and yellow dent corns for that year.
### TABLE I

Yields of Different Varieties of Corn in Bushels Per Acre, 1927-1936.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Falconer</td>
<td>32.0</td>
<td>32.8</td>
<td>20.2</td>
<td>24.0</td>
<td>7.30</td>
<td>11.95</td>
<td>19.50</td>
<td>7.85</td>
<td>26.75</td>
<td>4.50</td>
<td>27.25</td>
<td>12.98</td>
</tr>
<tr>
<td>Gehu</td>
<td>25.7</td>
<td>30.2</td>
<td>17.7</td>
<td>24.0</td>
<td>7.15</td>
<td>10.70</td>
<td>18.35</td>
<td>7.84</td>
<td>24.61</td>
<td>....</td>
<td>24.40</td>
<td>13.73 (a)</td>
</tr>
<tr>
<td>Minnesota 23</td>
<td>20.9</td>
<td>25.9</td>
<td>16.5</td>
<td>15.0</td>
<td>....</td>
<td>10.50</td>
<td>14.78</td>
<td>5.49</td>
<td>22.48</td>
<td>....</td>
<td>19.58</td>
<td>13.31 (b)</td>
</tr>
<tr>
<td>Minnesota 13</td>
<td>20.5</td>
<td>14.7</td>
<td>13.0</td>
<td>25.2</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>18.35</td>
<td>....</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Golden Glo</td>
<td>....</td>
<td>13.4</td>
<td>24.2</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>18.80 (c)</td>
<td>....</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Black Hills Yellow Dent</td>
<td>....</td>
<td>....</td>
<td>14.30</td>
<td>4.11</td>
<td>16.64</td>
<td>9.97</td>
<td>23.78</td>
<td>4.71</td>
<td>....</td>
<td>4.60 (d)</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Square Deal Yellow Dent</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>3.67 (d)</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>Pioneer White Dent</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>....</td>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

(a) Five years.
(b) Four years.
(c) Two years.
(d) One year.
Table I shows yields of the different varieties of corn during the years of favorable moisture conditions, 1927 to 1930, and also the yields for the more unfavorable years, 1931 to 1936. In this latter period the seasons of 1931, 1934, and 1936 were extremely dry with very little rain during the spring months. In these years yields were low. In 1933 and 1935 the rainfall was above normal in the later part of April and during May, but throughout the remainder of the summer the drought was severe.

Falconer gave the highest yield when averaged for all years of the test. In the early years of the test, Gehu was next to Falconer in yield, but from 1932 to 1935, inclusive, Black Hills Yellow Dent gave higher yields than Gehu.

Other varieties, including Pioneer White Dent, Square Deal Yellow Dent, and Minnesota 23, gave good yields and matured well. These matured in from 90 to 100 days and set ears from 15 inches to two feet above the ground.

Seed Beds for Corn

Table II shows the corn yields from different methods of seed-bed preparation. All of these preparations were on stubble ground, where the preceding crop had been either wheat or barley. Fall plowing, disk ing and listing were accomplished in October, and the spring preparations in April. The listed corn was planted in furrows approximately four inches deep. The openers, when attached to the corn planter, made furrows from two to three inches deep. Falconer corn was used in this test and was planted as near June 1 as weather would permit. The listed corn was harrowed immediately after planting. All of the plats were harrowed one or two times after the corn was up and were cultivated from two to three times during the summer.

A comparison of yields on the different seed beds, Table II, shows that, even in years with favorable moisture conditions, some methods were superior to others. In general, the larger yields of corn were obtained from seed beds that were prepared in the spring. The highest average yield in the five-year period, 1932 to 1936, inclusive, was from spring plowing 10 inches deep. This however, exceeded by only one-fourth of one bushel per acre the
TABLE II

Yields of Corn from Different Methods of Seed-Bed Preparation.

<table>
<thead>
<tr>
<th>Method of seed-bed preparation</th>
<th>1932</th>
<th>1933</th>
<th>1934</th>
<th>1935</th>
<th>1936</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall plowed</td>
<td>17.05</td>
<td>15.67</td>
<td>2.75</td>
<td>19.53</td>
<td>3.58</td>
<td>11.72</td>
</tr>
<tr>
<td>Fall double disked</td>
<td>18.20</td>
<td>14.05</td>
<td>3.90</td>
<td>26.26</td>
<td>4.13</td>
<td>13.31</td>
</tr>
<tr>
<td>Fall listed</td>
<td>16.70</td>
<td>15.90</td>
<td>5.70</td>
<td>25.16</td>
<td>6.32</td>
<td>13.96</td>
</tr>
<tr>
<td>Spring plowed, 6 inches deep</td>
<td>18.56</td>
<td>20.27</td>
<td>10.65</td>
<td>21.04</td>
<td>6.05</td>
<td>15.31</td>
</tr>
<tr>
<td>Spring plowed, 10 inches deep</td>
<td>20.07</td>
<td>19.46</td>
<td>10.67</td>
<td>20.05</td>
<td>7.15</td>
<td>15.57</td>
</tr>
<tr>
<td>Spring double disked</td>
<td>18.09</td>
<td>17.73</td>
<td>8.04</td>
<td>24.61</td>
<td>6.46</td>
<td>14.99</td>
</tr>
<tr>
<td>Spring disked, for listing</td>
<td>11.90</td>
<td>17.13</td>
<td>7.33</td>
<td>19.40</td>
<td>10.30</td>
<td>13.21</td>
</tr>
</tbody>
</table>

yield obtained from ordinary plowing five inches deep. This was not sufficient to pay for the extra cost of the deep plowing. The yield on spring double disking was just under 15 bushels per acre, and the lowest yield for the spring preparations was 13.21 bushels per acre when the corn had been listed. However, it may be noted that in the year 1936 this method gave considerably higher yields than did any other method that was tried.

The highest yield from any seed bed prepared in the fall was 13.96 bushels per acre on ground which had been listed in the fall and the ridges broken in the spring. The lowest yield was on fall plowing when the crop averaged 11.72 bushels per acre.

Time of Planting

Tests were made from 1932 to 1936, inclusive, of five different dates of planting, beginning on April 15 and planting at fifteen-day intervals up to June 15.

The seed bed was prepared by double disking the soil in the first part of April, except in 1932 when it was plowed. For the plantings of May 15, June 1, and June 15 the soil was disked again just before planting. Furrow openers were used on the corn planter, and from six to seven pounds of seed was planted per acre.

All plantings were harrowed after the corn emerged. The April 15 plantings in some years had to be cultivated as many as five times because of heavy weed growth. From three to four
cultivations were required for the plantings of May 1 and May 15, and for the plantings made in June, from two to three cultivations were usually sufficient to control weeds.

Both Falconer and Black Hills Yellow Dent corn were used in these tests. In the case of these two varieties the later plantings gave the higher yields. Black Hills Yellow Dent gave the highest average yield when planted June 15, and Falconer, the highest average yield when planted June 1.

Corn planted April 15 and May 1 generally did not come up until from three to four weeks later and showed a poorer stand than corn which was planted in June.

<table>
<thead>
<tr>
<th>Date of planting</th>
<th>1932</th>
<th>1933</th>
<th>1934</th>
<th>1935</th>
<th>1936</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 15</td>
<td>10.05</td>
<td>4.36</td>
<td>.94</td>
<td>6.61</td>
<td>2.29</td>
<td>4.85</td>
</tr>
<tr>
<td>May 1</td>
<td>12.91</td>
<td>10.04</td>
<td>2.19</td>
<td>20.84</td>
<td>1.91</td>
<td>9.58</td>
</tr>
<tr>
<td>May 15</td>
<td>11.38</td>
<td>12.74</td>
<td>3.31</td>
<td>24.01</td>
<td>2.05</td>
<td>10.70</td>
</tr>
<tr>
<td>June 1</td>
<td>15.50</td>
<td>13.22</td>
<td>3.46</td>
<td>27.16</td>
<td>2.87</td>
<td>12.44</td>
</tr>
<tr>
<td>June 15</td>
<td>18.17</td>
<td>8.15</td>
<td>1.62</td>
<td>32.49</td>
<td>4.09</td>
<td>12.90</td>
</tr>
</tbody>
</table>

Although crop yields varied considerably with the amount and time of rainfall, yet an average of the five years’ trials shows that yields increased as the planting date was delayed. The lowest yields were from the April 15 planting. Corn planted in June averaged higher yields than the April or May plantings and also required fewer cultivations to control weeds.

Methods of Planting

The methods included regular surface planting, planting with furrow openers attached to the planter, and listing.

Land that had been in wheat or barley the previous year was used in these trials. It was plowed in April and harrowed immediately where the corn planter was used, and the ground was disked in April where the corn was listed. Falconer corn was planted June 1 at the rate of six pounds per acre. The rows
were spaced forty-two inches apart. The listed corn was harrowed immediately after planting. All the plats were harrowed one or two times after the corn was up and cultivated from two to three times during the summer.

Surface planted corn required more work to keep it free of weeds than did corn that was planted by the use of furrow openers or by listing. In the latter methods of planting, the corn was protected somewhat from drought because the furrows tended to hold the run-off from summer rains.

Table IV shows the yields from the different methods of planting. The furrow planted corn gave the highest yield, except in 1931, when surface planted corn produced .22 of a bushel more per acre, and in 1936, when listed corn produced 1.5 bushels more per acre. For the six years, 1931-1936, furrow planted corn averaged two bushels per acre more than either surface planted or listed corn. Although listing was a cheaper method of seed-bed preparation, yet the increased yield of two bushels per acre on furrow planting was sufficient to pay for the additional expense of plowing.

**Corn in Widely Spaced Rows**

In years of low rainfall the spacing of corn rows more than 42 inches apart is sometimes desirable, because the yield of the succeeding crop of small grain may be increased.

For this test the ground was double disked early in the spring and Falconer corn was planted as near June 1 as weather would permit. Furrow openers were used on the corn planter. The rate of seeding for the 42-inch rows was six pounds per acre, and
three pounds per acre for the 84-inch rows. All corn was harrowed one or two times after coming up and cultivated from two to three times during the summer. In years of favorable moisture conditions the 42-inch rows gave the highest yield, and in dry years, as 1934 and 1936, there was very little difference in yields from the two different spacings of the rows. However, as shown in Table V, the six-year average yield of corn in 84-inch rows was 1.17 bushels per acre less than the corn in 42-inch rows, but the four-year average yield of winter wheat which was seeded in the wider spaced corn rows was 2.79 bushels more per acre than where it was seeded in the regular spaced rows.

In 1935 a plat was added to this test in which the corn rows were 126 inches apart. Because the yields were considerably lower from the 126-inch rows than from the other spacings, even in the dry year of 1936, this wide spacing did not prove worth while.

<table>
<thead>
<tr>
<th>Width of corn rows</th>
<th>Yields in bushels per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1931</td>
</tr>
<tr>
<td>42-inch</td>
<td>10.12</td>
</tr>
<tr>
<td>126-inch</td>
<td></td>
</tr>
</tbody>
</table>

*Two-year average.
SUMMARY

1. The ability of corn to produce a crop in drought years makes it desirable for dry lands.

2. In ten years, 1927-1936, there has not been a complete corn crop failure on the Experiment Farm at Gillette.

3. Hardy varieties of both flint and dent corns that mature from early to mid-season, ripen and yield well.

4. Spring seed-bed preparations averaged higher yields in nearly all cases than seed beds prepared in the fall.

5. Fall plowing gave the lowest yields of all the seed-bed preparations that were used.

6. Early spring plowing gave higher yields than early spring disk ing.

7. Deep spring plowing did not increase yields enough to pay the extra cost of deep plowing, compared with ordinary plowing.

8. Corn planted from June 1 to June 15 gave higher yields than corn planted from April 15 to May 15 and required fewer cultivations.

9. Furrow planted corn gave higher yields than corn that was surface planted or listed.

10. In years of normal rainfall regularly spaced corn rows gave higher yields than wider spacings. In years of drought the 84-inch rows gave as high yields as regular 42-inch rows, and in those years, grain following the 84-inch rows gave larger yields than when it followed regular 42-inch rows.