1979

EC79-103 Nebraska Varietal Tests of Fall-Sown Small Grains 1979

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NEBRASKA VARIETAL TESTS
OF FALL-SOWN SMALL GRAINS
1979

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R. S. MOOMAW

Extension work in "Agriculture,
Home Economics and subjects relating
thereto," The Cooperative Extension Service,
Institute of Agriculture and Natural Resources,
University of Nebraska–Lincoln, Cooperating with
the Counties and the U.S. Department of Agriculture
Leo E. Lucas, Director
This circular is a progress report of varietal tests conducted by the variety evaluation and small grain breeding projects of the Agricultural Experiment Station. Cooperating were the Agronomy Department and the Northeast, South Central, North Platte, and Panhandle Stations. The Outstate Testing Circular series is being replaced with Extension Circulars.

Acknowledgment is made to V. A. Johnson for results obtained in experiments conducted in cooperation with the U. S. Department of Agriculture, Agricultural Research Service; to C. R. Fenster for results obtained at the High Plains and Northwest Agricultural Laboratories and to County Agents and others who assisted in these tests. Special acknowledgment is made to the farmer cooperators who furnished land for the off-station trials.
NEBRASKA WHEAT PRODUCTION

The following data were obtained from Nebraska Agricultural Statistics. Acreages and yield averages include both spring and winter wheat. Separate report series for spring and winter wheats began in 1909 and were discontinued in 1962.

<table>
<thead>
<tr>
<th>Year</th>
<th>Planted 000 acres (hectares)</th>
<th>Harvested 000 acres (hectares)</th>
<th>Average yield bu/A (kg/ha)</th>
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<td>1866</td>
<td>--- ---</td>
<td>43 ( 17)</td>
<td>14.0 ( 942)</td>
</tr>
<tr>
<td>1870</td>
<td>--- ---</td>
<td>170 ( 69)</td>
<td>11.5 ( 773)</td>
</tr>
<tr>
<td>1880</td>
<td>--- ---</td>
<td>1520 ( 616)</td>
<td>8.5 ( 572)</td>
</tr>
<tr>
<td>1890</td>
<td>--- ---</td>
<td>1775 ( 719)</td>
<td>12.0 ( 807)</td>
</tr>
<tr>
<td>1900</td>
<td>--- ---</td>
<td>2750 (1114)</td>
<td>14.7 ( 921)</td>
</tr>
<tr>
<td>1910</td>
<td>--- ---</td>
<td>2885 (1168)</td>
<td>15.8 (1063)</td>
</tr>
<tr>
<td>1920</td>
<td>3883 (1573)</td>
<td>3593 (1455)</td>
<td>16.8 (1130)</td>
</tr>
<tr>
<td>1930</td>
<td>4077 (1651)</td>
<td>3974 (1609)</td>
<td>18.8 (1264)</td>
</tr>
<tr>
<td>1940</td>
<td>3278 (1328)</td>
<td>2643 (1070)</td>
<td>13.1 ( 881)</td>
</tr>
<tr>
<td>1950</td>
<td>4346 (1760)</td>
<td>4051 (1641)</td>
<td>21.8 (1466)</td>
</tr>
<tr>
<td>1955</td>
<td>3484 (1411)</td>
<td>3141 (1272)</td>
<td>24.9 (1675)</td>
</tr>
<tr>
<td>1956</td>
<td>3549 (1437)</td>
<td>3324 (1346)</td>
<td>19.5 (1312)</td>
</tr>
<tr>
<td>1957</td>
<td>3294 (1334)</td>
<td>2920 (1183)</td>
<td>27.0 (1816)</td>
</tr>
<tr>
<td>1958</td>
<td>3620 (1466)</td>
<td>3442 (1394)</td>
<td>33.0 (2220)</td>
</tr>
<tr>
<td>1959</td>
<td>3408 (1380)</td>
<td>3104 (1257)</td>
<td>22.0 (1480)</td>
</tr>
<tr>
<td>1960</td>
<td>3306 (1339)</td>
<td>3011 (1219)</td>
<td>28.5 (1917)</td>
</tr>
<tr>
<td>1961</td>
<td>3339 (1352)</td>
<td>3220 (1304)</td>
<td>24.5 (1648)</td>
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<tr>
<td>1962</td>
<td>3060 (1239)</td>
<td>2760 (1118)</td>
<td>19.5 (1312)</td>
</tr>
<tr>
<td>1963</td>
<td>3244 (1314)</td>
<td>2815 (1140)</td>
<td>21.5 (1446)</td>
</tr>
<tr>
<td>1964</td>
<td>3147 (1275)</td>
<td>3871 (1663)</td>
<td>24.5 (1648)</td>
</tr>
<tr>
<td>1965</td>
<td>3273 (1326)</td>
<td>2727 (1104)</td>
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</tr>
<tr>
<td>1966</td>
<td>2980 (1207)</td>
<td>2860 (1158)</td>
<td>35.0 (2354)</td>
</tr>
<tr>
<td>1967</td>
<td>3520 (1426)</td>
<td>3265 (1322)</td>
<td>26.5 (1782)</td>
</tr>
<tr>
<td>1968</td>
<td>3240 (1312)</td>
<td>3070 (1243)</td>
<td>32.0 (2152)</td>
</tr>
<tr>
<td>1969</td>
<td>2910 (1179)</td>
<td>2650 (1073)</td>
<td>31.5 (2119)</td>
</tr>
<tr>
<td>1970</td>
<td>2565 (1039)</td>
<td>2410 ( 976)</td>
<td>38.0 (2556)</td>
</tr>
<tr>
<td>1971</td>
<td>2539 (1028)</td>
<td>2434 ( 986)</td>
<td>42.0 (2825)</td>
</tr>
<tr>
<td>1972</td>
<td>2742 (1111)</td>
<td>2509 (1016)</td>
<td>37.0 (2489)</td>
</tr>
<tr>
<td>1973</td>
<td>2800 (1134)</td>
<td>2680 (1085)</td>
<td>35.0 (2354)</td>
</tr>
<tr>
<td>1974</td>
<td>3000 (1215)</td>
<td>2900 (1175)</td>
<td>34.0 (2287)</td>
</tr>
<tr>
<td>1975</td>
<td>3200 (1296)</td>
<td>3070 (1243)</td>
<td>32.0 (2152)</td>
</tr>
<tr>
<td>1976</td>
<td>3400 (1377)</td>
<td>2950 (1195)</td>
<td>32.0 (2152)</td>
</tr>
<tr>
<td>1977</td>
<td>3300 (1337)</td>
<td>2950 (1195)</td>
<td>35.0 (2354)</td>
</tr>
<tr>
<td>1978</td>
<td>2900 (1174)</td>
<td>2600 (1053)</td>
<td>32.0 (2152)</td>
</tr>
<tr>
<td>1979 1/</td>
<td>3000 (1215)</td>
<td>2600 (1053)</td>
<td>33.0 (2220)</td>
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</tbody>
</table>

1/ August 1 estimate.
NEBRASKA VARIETAL TESTS OF FALL-SOWN SMALL GRAINS

1979

This circular is a progress report of winter wheat and winter barley variety tests conducted throughout Nebraska. Entries included varieties and promising experimental strains from the breeding programs of the Nebraska and other Experiment Stations. The state has been divided into 8 districts for purposes of varietal testing and recommendation. Locations of these districts and the 1979 variety tests are shown on the map (Page 4).

Trials were located on Experiment Stations and private farms. Names of cooperators and dates of planting and harvest are shown in Table 1. The soil type, soil test data and fertilizer applied for the 1979 crop are shown in Table 2.

Tests on Experiment Stations were drill strips 75 to 100 feet (23 to 30 meters) long. Other plots were of the nursery type consisting of 6 rows 10 to 15 feet (3 to 5 meters) in length. Plots were replicated 4 to 6 times, depending on location.

Wheat was seeded under generally favorable moisture conditions in the fall of 1978 except in Southwest Nebraska. Here April through August rainfall was only 76% of normal. Wheat seedbeds were loose and dry.

Fall weather continued dry and wheat made less than usual fall growth. Winter moisture and snow cover were variable but generally adequate except in East Central Nebraska. January temperatures were the lowest of record. Spring growth began later than normal.

Areas of winterkilled fields or portions of fields became evident in April. East Central and sections of Southern Nebraska showed the most damage. Wheat plants were weakened by extreme cold combined with lack of snow cover. The weakened plants were more susceptible to root and crown rots.

A total of 87% of the planted acreage was harvested. This compares with the 88% harvested in 1978 and the five-year (1977-1979) average of 93%.

Early spring moisture was adequate. June was warm and dry. Wheat headed and ripened 1 to 2 weeks later than normal. Rains and lack of hot winds in early July were favorable for late grain fill. July rains delayed harvest, especially in the Panhandle.

The estimated average yield was 33.0 bushels per acre (2220 kg/ha) from 2,600,000 harvested acres (1,053,000 hectares). Comparable figures for 1978 were 32 bushels per acre (2152 kg/ha) from 2,550,000 acres (1,032,750 hectares). These estimates are preliminary and subject to revision.
NEBRASKA CROP TESTING DISTRICTS AND LOCATIONS OF 1979
WINTER WHEAT & WINTER BARLEY VARIETY TESTS.
Table 1. Locations and dates of planting of winter wheat and winter barley variety tests. 1979.

<table>
<thead>
<tr>
<th>County</th>
<th>Cooperator</th>
<th>Planted</th>
<th>Harvested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dakota</td>
<td>Leland George, South Sioux City</td>
<td>Sept. 25</td>
<td>July 9</td>
</tr>
<tr>
<td>Dixon</td>
<td>Northeast Station</td>
<td>Sept. 25</td>
<td></td>
</tr>
<tr>
<td>Pawnee</td>
<td>Galen Bernadt, Steinauer</td>
<td>Oct. 3</td>
<td>July 9</td>
</tr>
<tr>
<td>Lancaster</td>
<td>Paul Nordstrom, Waverly</td>
<td>Sept. 29</td>
<td></td>
</tr>
<tr>
<td>Saunders</td>
<td>Mead Field Laboratory</td>
<td>Sept. 26</td>
<td></td>
</tr>
<tr>
<td>Polk</td>
<td>Duane Jones, Osceola</td>
<td>Sept. 25</td>
<td>July 11</td>
</tr>
<tr>
<td>Clay</td>
<td>South Central Station</td>
<td>Sept. 21</td>
<td>July 19</td>
</tr>
<tr>
<td>Webster</td>
<td>Wendell Lockhart, Bladen</td>
<td>Sept. 20</td>
<td>July 13</td>
</tr>
<tr>
<td>Howard</td>
<td>Ray Leth, St. Paul</td>
<td>Sept. 25</td>
<td>July 18</td>
</tr>
<tr>
<td>Custer</td>
<td>Don Cantrell, Merna</td>
<td>Sept. 13</td>
<td>July 12</td>
</tr>
<tr>
<td>Hitchcock</td>
<td>Tom Baker, Trenton</td>
<td>Sept. 14</td>
<td>July 9</td>
</tr>
<tr>
<td>Lincoln</td>
<td>North Platte Station</td>
<td>Sept. 13</td>
<td>July 16</td>
</tr>
<tr>
<td>Perkins</td>
<td>Ralph Holzfaster, Paxton</td>
<td>Sept. 14</td>
<td>July 10</td>
</tr>
<tr>
<td>Deuel</td>
<td>Floyd Stohr, Chappell</td>
<td>Sept. 12</td>
<td>July 23</td>
</tr>
<tr>
<td>Cheyenne</td>
<td>High Plains Agricultural Laboratory</td>
<td>Sept. 15</td>
<td>July 28</td>
</tr>
<tr>
<td>Scotts Bluff</td>
<td>Bob Roberts, McGrew</td>
<td>Sept. 13</td>
<td></td>
</tr>
<tr>
<td>Box Butte</td>
<td>Northwest Agricultural Laboratory</td>
<td>Sept. 12</td>
<td>July 26</td>
</tr>
<tr>
<td>Dawes</td>
<td>Ralph Rhoads, Chadron</td>
<td>Sept. 14</td>
<td>July 18</td>
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</table>

Winter Wheat

<table>
<thead>
<tr>
<th>County</th>
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<td>Agricultural Experiment Station</td>
<td>Sept. 26</td>
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<td>Clay</td>
<td>South Central Station</td>
<td>Sept. 21</td>
<td></td>
</tr>
<tr>
<td>Webster</td>
<td>Wendell Lockhart, Bladen</td>
<td>Sept. 20</td>
<td>July 13</td>
</tr>
<tr>
<td>Lincoln</td>
<td>North Platte Station</td>
<td>Sept. 15</td>
<td></td>
</tr>
<tr>
<td>Perkins</td>
<td>Ralph Holzfaster, Paxton</td>
<td>Sept. 14</td>
<td>July 10</td>
</tr>
<tr>
<td>Cheyenne</td>
<td>High Plains Agricultural Laboratory</td>
<td>Sept. 14</td>
<td>July 26</td>
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</table>

Winter Barley

Average yields by Crop Reporting Districts were as follows:

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<tr>
<td></td>
<td>bu/A (kg/ha)</td>
<td>bu/A (kg/ha)</td>
<td>bu/A (kg/ha)</td>
<td>bu/A (kg/ha)</td>
<td>bu/A (kg/ha)</td>
</tr>
<tr>
<td>Northwest</td>
<td>32.7 (2199)</td>
<td>31.0 (2085)</td>
<td>33.7 (2267)</td>
<td>34.4 (2314)</td>
<td>31.0 (2085)</td>
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<tr>
<td>North</td>
<td>24.8 (1668)</td>
<td>25.8 (1735)</td>
<td>32.1 (2159)</td>
<td>32.0 (2152)</td>
<td>26.0 (1749)</td>
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<tr>
<td>Northeast</td>
<td>27.6 (1856)</td>
<td>30.0 (2018)</td>
<td>30.4 (2044)</td>
<td>29.4 (1977)</td>
<td>30.0 (2018)</td>
</tr>
<tr>
<td>Central</td>
<td>30.8 (2072)</td>
<td>33.6 (2260)</td>
<td>36.8 (2475)</td>
<td>33.7 (2267)</td>
<td>35.0 (2354)</td>
</tr>
<tr>
<td>East</td>
<td>33.7 (2267)</td>
<td>30.4 (2045)</td>
<td>30.7 (2065)</td>
<td>29.0 (1951)</td>
<td>37.0 (2489)</td>
</tr>
<tr>
<td>Southwest</td>
<td>35.7 (2401)</td>
<td>29.4 (1977)</td>
<td>38.9 (2616)</td>
<td>33.3 (2240)</td>
<td>33.0 (2220)</td>
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<tr>
<td>South</td>
<td>28.3 (1903)</td>
<td>33.3 (2240)</td>
<td>40.8 (2744)</td>
<td>29.1 (1957)</td>
<td>35.0 (2354)</td>
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<tr>
<td>Southeast</td>
<td>27.9 (1877)</td>
<td>36.5 (2455)</td>
<td>31.5 (2119)</td>
<td>29.4 (1977)</td>
<td>33.3 (2240)</td>
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<tr>
<td>State</td>
<td>32.0 (2152)</td>
<td>32.0 (2152)</td>
<td>35.0 (2354)</td>
<td>32.0 (2152)</td>
<td>33.0 (3220)</td>
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<tr>
<td>County</td>
<td>Soil Type</td>
<td>1978 crop</td>
<td>pH</td>
<td>P ppm</td>
<td>Nitrate N lb/A (kg/ha)</td>
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<tr>
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<td>----------------------------------</td>
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<td>-----</td>
<td>-------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Dakota</td>
<td>Onawa silty clay loam</td>
<td>Wheat</td>
<td>8.0</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Pawnee</td>
<td>Pawnee clay loam (eroded)</td>
<td>Idle</td>
<td>6.3</td>
<td>2</td>
<td>75 (84)</td>
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<tr>
<td>Polk</td>
<td>Holder silt loam</td>
<td>Idle</td>
<td>5.3</td>
<td>11</td>
<td>151 (169)</td>
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<tr>
<td>Clay</td>
<td>Crete silty clay loam</td>
<td>Fallow</td>
<td>---</td>
<td>9</td>
<td>169 (189)</td>
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<tr>
<td>Webster</td>
<td>Holdrege silt loam</td>
<td>Wheat</td>
<td>---</td>
<td>10</td>
<td>128 (143)</td>
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<tr>
<td>Howard</td>
<td>Ortello fine sandy loam</td>
<td>Fallow</td>
<td>---</td>
<td>5</td>
<td>66 (74)</td>
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<tr>
<td>Custer</td>
<td>Kenesaw silt loam</td>
<td>Fallow</td>
<td>5.8</td>
<td>45</td>
<td>237 (266)</td>
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<tr>
<td>Hitchcock</td>
<td>Keith silt loam</td>
<td>Fallow</td>
<td>6.5</td>
<td>22</td>
<td>119 (133)</td>
</tr>
<tr>
<td>Lincoln</td>
<td>Holdrege silt loam</td>
<td>Fallow</td>
<td>---</td>
<td>---</td>
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<tr>
<td>Perkins</td>
<td>Kuma silt loam</td>
<td>Fallow</td>
<td>6.1</td>
<td>44</td>
<td>124 (139)</td>
</tr>
<tr>
<td>Deuel</td>
<td>Keith-Kuma silt loam</td>
<td>Fallow</td>
<td>7.1</td>
<td>148</td>
<td>107 (120)</td>
</tr>
<tr>
<td>Cheyenne</td>
<td>Keith silt loam</td>
<td>Fallow</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
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<td>Box Butte</td>
<td>Keith very fine sandy loam</td>
<td>Fallow</td>
<td>6.7</td>
<td>20</td>
<td>166 (186)</td>
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<tr>
<td>Dawes</td>
<td>Keith silt loam</td>
<td>Fallow</td>
<td>7.7</td>
<td>8</td>
<td>79 (89)</td>
</tr>
</tbody>
</table>

1/ P and organic matter determinations for 0-6 inch (0-15 cm) depth. Nitrate N is for 6-foot depth (183 cm) except 3 foot (91 cm) for Deuel, Scotts Bluff and Dawes Counties and 5 foot (152 cm) for Box Butte County.

2/ Anhydrous ammonia before soil sampled.

3/ Fertilized before sampling.
Winter Wheat Varieties

The State-Federal Division of Agricultural Statistics makes an annual survey of wheat varieties planted. The ten-year summary of Nebraska data is shown in Table 3. This gives an indication of changes in popularity of varieties. It should be recognized that acreages of many individual varieties are concentrated in specific areas of the state. Other varieties such as Scout 66 and Centurk are widely distributed over all areas.

Characteristics of named wheat varieties included in current Nebraska tests are summarized in Table 4. These characteristics are applicable to varieties when grown in their area of adaptation. When taken out of their area of adaptation varieties may have different maturity, winterhardiness, or straw strength ratings. Several varieties adapted in western Nebraska have poor straw when grown in eastern Nebraska under more humid conditions. Races of rust and other diseases are under constant change. Varieties which in the past were resistant to stem rust are now susceptible. As rust races change, presently resistant varieties may become susceptible.

Long-time yield data, other agronomic characteristics, and current market demands were considered in the listing of wheat varieties for Nebraska shown on the map (Page 10). These varieties are considered the best available for general use in the areas shown. This map and information in Table 4 in conjunction with yield data for specific areas provide the basis for variety selection.

Brief descriptions of winter wheat varieties are given in NebGuide G 73-24. Recent changes in suggested varieties include Bennett, Centurk 78, Larned and Roughrider.

Bennett (NE73644) was selected from the cross of a sister line to Buckskin with Homestead and released in 1978. The purpose of the cross was to combine the stem rust resistance of both parents. It is not so resistant to soil borne mosaic as Homestead but is superior in straw strength to either parent. Kernel weight is high. Bennett is an early, moderately winter-hardy variety best adapted to south central and southeastern Nebraska. Bennett appears to be capable of carrying a high level of Hessian fly infestation without showing the lodging found in other susceptible varieties.

Centurk 78 (NE69291) is an increase from a S-head selection from Centurk. It was released in 1978. It has been extensively tested and yield performance has consistently slightly exceeded Centurk.

Larned was selected in Kansas and released in 1976. The pedigree is Scout x Ottawa backcrossed to Scout 4 times. Larned is similar to Scout with improved straw strength and a much higher level of Hessian fly resistance.

Roughrider was developed in North Dakota and released in 1975. It has a higher level of winterhardiness than varieties currently grown in Nebraska. It is a late variety and under Nebraska conditions, would have a lower yield potential, except when winterkilling was severe.
Table 3. Estimated percentage of Nebraska winter wheat acreage planted to each variety. 1970-1979.

<table>
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<tr>
<th></th>
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<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Centurk &amp; Centurk 78</td>
<td>----</td>
<td>----</td>
<td>2.0</td>
<td>22.5</td>
<td>31.0</td>
<td>33.5</td>
<td>32.9</td>
<td>35.4</td>
<td>39.6</td>
<td>41.4</td>
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<tr>
<td>Scout &amp; Scout 66</td>
<td>30.6</td>
<td>37.2</td>
<td>36.9</td>
<td>28.8</td>
<td>30.2</td>
<td>30.3</td>
<td>29.0</td>
<td>24.1</td>
<td>23.3</td>
<td>25.4</td>
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<td>Buckskin</td>
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<td>----</td>
<td>----</td>
<td>.1</td>
<td>.8</td>
<td>2.5</td>
<td>4.2</td>
<td>3.7</td>
<td>5.1</td>
</tr>
<tr>
<td>Lancer</td>
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1/ Other varieties planted for 1979 include Bennett, Bison, Caprock, Larned, Nebred, Newton, Omaha, Ottawa, Parker, Ranger, Sturdy, Trison, Triumph, Wichita.
Table 4. Characteristics of winter wheat varieties included in Nebraska tests. 1979. 1/

<table>
<thead>
<tr>
<th>Variety</th>
<th>Maturity</th>
<th>Winter-hardiness</th>
<th>Straw strength</th>
<th>Milling &amp; baking qualities</th>
<th>Hessian fly</th>
<th>Leaf rust</th>
<th>Stem rust</th>
<th>Soil borne mosaic 3/</th>
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<td>Good</td>
<td>Medium</td>
<td>Good</td>
<td>MR</td>
<td>S</td>
<td>R</td>
<td>MS</td>
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<tr>
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<td>Early</td>
<td>Fair</td>
<td>Medium</td>
<td>Excellent</td>
<td>MS</td>
<td>S</td>
<td>R</td>
<td>S</td>
</tr>
<tr>
<td>Bennett</td>
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<td>Good</td>
<td>Strong</td>
<td>Excellent</td>
<td>4/</td>
<td>S</td>
<td>R</td>
<td>MR</td>
</tr>
<tr>
<td>Buckskin</td>
<td>Med. early</td>
<td>Fair</td>
<td>Strong</td>
<td>Excellent</td>
<td>MR</td>
<td>S</td>
<td>R</td>
<td>MR</td>
</tr>
<tr>
<td>Centurk</td>
<td>Med. early</td>
<td>Good</td>
<td>Strong</td>
<td>Excellent</td>
<td>MS</td>
<td>S</td>
<td>R</td>
<td>MS</td>
</tr>
<tr>
<td>Centurk 78</td>
<td>Med. early</td>
<td>Good</td>
<td>Strong</td>
<td>Excellent</td>
<td>MR</td>
<td>S</td>
<td>R</td>
<td>MS</td>
</tr>
<tr>
<td>Eagle</td>
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<td>R</td>
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<td>Excellent</td>
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<td>R</td>
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<tr>
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<td>Medium</td>
<td>Excellent</td>
<td>MR</td>
<td>S</td>
<td>MR</td>
<td>S</td>
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<tr>
<td>Roughrider</td>
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<td>Medium</td>
<td>Good</td>
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<td>S</td>
<td>R</td>
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<tr>
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<td>Fair</td>
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<tr>
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<td>Medium</td>
<td>Excellent</td>
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<td>S</td>
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<tr>
<td>Scoutland</td>
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<td>R</td>
<td>MS</td>
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<tr>
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<td>Poor</td>
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<tr>
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<td>S</td>
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<td>Strong</td>
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<td>R</td>
<td>S</td>
<td>S</td>
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</table>

1/ These apply to area of adaptation. When varieties are taken out of their adapted area, relative maturities, straw strength and other characteristics are subject to variations. Abnormal disease or insect infestations also cause differences in expression of plant characteristics.

2/ R = resistant, S = susceptible, MR = moderately resistant, MS = moderately susceptible.

3/ Based on limited observation and yield data.

4/ Carries high level of fly infestation without characteristic straw breakage found in other varieties.
AGATE
CENTURK
HIPLAINS
LANCER
SCOUT 66

* WEST 1/2
** NORTH 1/2
*** LESS HARDY THAN LANCER
CENTURK 78 IN ALL AREAS WITH CENTURK

CENTURK***
LANCER
ROUGH RIDER

CENTURK***
LANCER
SCOUT 66

AGATE*
CENTURK
HIPLAINS*
LANCER
SCOUT 66
SENTINEL

BUCKSKIN
CENTURK
EAGLE
HIPLAINS**
LANCER
LANCOTA
LARNED
SAGE
SCOUT 66
SENTINEL

BENNETT
CENTURK
GAGE
HOMESTEAD
LANCOTA
LARNED
SCOUTLAND

LANCOTA
LARNED
SAGE
SCOUT 66
SCOUTLAND
SENTINEL

SUGGESTED WINTER WHEAT VARIETIES FOR NEBRASKA
Winter Wheat Performance

Yield and other data by districts are shown in Tables 5 through 11. Results of 1979 trials are shown along with period-of-years data, where appropriate.

Test weight data are shown in Table 12. Kernel weight data are shown in Table 13. Protein content for 1979 is shown in Table 14 and 1971-1979 protein data are summarized in Table 14. Plant height is shown in Table 15 and survival and lodging data in Table 16.

Yielding ability of different varieties cannot be measured with absolute accuracy because of variations in soil fertility, moisture and other factors. For this reason, small differences in yield have no significance. Unless the difference in yield of two varieties is greater than the difference required for significance shown in the tables, little confidence can be placed in the superiority of the one over the other in that particular test. These differences are shown at the 5% level, meaning that differences as large or larger could be expected through chance alone in 1 of 20 trials.

Two trials were seeded in Northeast Nebraska. The Dixon County trial had poor emergence and no survival. The Dakota County trial had some stand problems but recovery was good and yields were excellent (Table 5). Yield data are also shown for 1976 and 1977.

Southeast District trials were seeded in Saunders, Lancaster and Pawnee Counties. The Saunders County trial had little fall growth and severe winterkilling and was abandoned. Spotted winterkilling in Lancaster County made accurate yield checks impossible. Good yields were produced in Pawnee County (Table 6).

Buckskin, Larned and Agate had the highest 1979 yields. Many varieties had equivalent four-year average yields. Bennett, Larned, Sage, Buckskin, Centurk and Centurk 78 had average 1976-1979 yields of 50 bushels or more (3360 kg/ha).

South Central District trials in Polk County and Webster represented widely different environmental conditions (Table 7). In Polk County, all varieties had good survival. Straw growth was heavy and many varieties lodged early. Lindon and Vona were high-yielding. Yield levels in Clay County were much lower. Buckskin and Lancer were highest in yield. Poor survival reduced yields of some varieties, especially Vona. In Webster County, moderately good yields were produced and varietal yield differences were not marked.

Many varieties had equivalent four-year average yields. Bennett and Lindon were highest in 1976-1979 average yield.

The two Central District trials represented different environments (Table 8). Soil variability was high in Howard County and yield differences were nonsignificant. Conditions were favorable in Custer County and an average yield of 61 bushels (4100 kg/ha) was produced. Vona, Larned, Lindon, Sage were most productive under these conditions. This is an area of greatly differing seasonal conditions. Many varieties have equivalent long-time records. Centurk, Centurk 78, Larned, Warrior, Bennett, Scout 66 and Buckskin had the highest four-year average yields.
Three trials were harvested in the Southwest District (Table 9). Conditions at seeding were very dry in Hitchcock County. There was little stooling but favorable conditions for grain filling resulted in a satisfactory yield. Yields in Lincoln and Perkins County were high. Buckskin, Centurk 78 and Agate had the highest 1979 average yields.

Centurk 78 and Centurk had the highest four-year average yields. Many varieties had comparable records for this period.

Four trials were harvested in the Panhandle (Table 10). A trial in Scotts Bluff County was abandoned because of poor stands. Conditions in Deuel, Cheyenne and Box Butte County were favorable. High fertility in Dawes County was followed by moisture stress in late June. This was the major factor in varietal performance at this location.

In the average of four 1979 trials, Vona, Lindon, Centurk 78 and Centurk were highest in yield. All responded well to favorable growing conditions. Centurk, Centurk 78 and Lindon had the highest four-year average performance records (Table 11).

Statewide averages give an indication of whether a variety has broad adaptation. Many varieties have wide adaptation and do well over an extended range of conditions. Others are more specific in their requirements. Often, factors other than yield determine specific areas of adaptation. Performance of varieties in Nebraska was summarized on the basis of three broad areas: the entire state, the eastern one-half, and the western one-half. The Northeast District represents a set of special conditions and results were not included in statewide summaries.

Eleven varieties were included at all 13 test locations in 1979. Average yields were as follows: Buckskin 49 (3300), Centurk 78 49 (3300), Larned 48 (3230), Centurk 48 (3230), Agate 47 (3160), Lancer 47 (3160), Scout 66 46 (3090), Sage 46 (3090), Bennett 45 (3030), Lancota 42 (2820) and Turkey 40 (2690) bushels per acre (kg/ha). Previous year high average yields were as follows: 1978 Centurk 78 and Centurk 43 (2890), 1977 Buckskin, Sage, Larned and Bennett 43 (2890), 1976 Bennett 50 (3360), 1975 Lindon 50 (3360), 1975 Lindon 50 (3360), 1974 Centurk, Sage and Lancota 49 (3300), 1973 Sage 47 (3160), 1972 Centurk and Buckskin 48 (3230); 1971, 1970 and 1969 Centurk 57 (3830), 52 (3500), 42 (2820) bushels per acre (kg/ha) respectively.

In four Southeast and South Central District trials Buckskin, Larned and Lancer were most productive with yields of 47 (3160), 46 (3090) and 45 (3030) bushels per acre (kg/ha) respectively. Other varieties produced as follows: Agate 44 (2960), Scout 66 44 (2960), Bennett 43 (2890), Centurk 43 (2890), Sage 43 (2890), Centurk 78 43 (2890), Lancota 43 (2890), Sentinel 43 (2890), Gage 43 (2890), Homestead 42 (2820), and Turkey 37 (2490).

In nine experiments in the western one-half of Nebraska, Vona produced 52 (3500) and Centurk 78 51 (3430) bushels per acre (kg/ha). Other varieties yielded as follows: Centurk 50 (3360), Lindon 50 (3360), Buckskin 49 (3300), Larned 49 (3300), Agate 48 (3230), Lancer 47 (3160), Sage 47 (3160), Bennett 46 (3090), Scout 66 46 (3090), HiPlains 46 (3090), Lancota 42 (2820) and Turkey 41 (2760) bushels per acre (kg/ha).
Buckskin and Larned had good yield records in all parts of Nebraska in 1979. Centurk and Centurk 78 were consistently among the top varieties all over the state. Conditions for late grain fill favored later varieties, especially in eastern Nebraska. Agate and Lancer had better than usual relative yields in that area. Seasonal conditions did not favor Bennett. It had an excellent four-year average record especially in southern and eastern Nebraska. Vona and Lindon were erratic in performance. These varieties are very productive under favorable conditions. In other trials, winterkilling and other stresses caused reduced yields.

Test weights of wheat varieties in each trial are shown in Table 12. These were generally high. Low test weights in Clay County were at least partially due to poor cleaning.

Kernel weights from 12 locations are included in Table 13. All except Clay County are high, reflecting favorable grain-filling conditions. Agate had the heaviest kernels followed by the Scout types and Bennett.

Grain protein data are shown in Table 14. Protein content was low at many locations. As shown in Table 15, grain protein was lower than far any other year for the 1971-1979 period. Turkey and Lancota were consistently high in protein.

Plant height data are included in Table 16. Survival and lodging data are shown in Table 17. Lodging was severe in Polk County. Early lodging at this location reduced yields of affected varieties.

Winter Barley Performance

Yield data for three of the six winter barley variety trials are shown in Table 18. Trials in Lancaster and Clay Counties had severe winterkilling. Actual survivals in Webster County were higher than the early spring readings shown. Excellent yields were produced in Perkins County. Data for trials since 1975 are shown in Table 19.

THE METRIC SYSTEM

Data in this circular are given in currently used U.S. units followed by the metric units in parentheses ( ). Equivalents and conversions used were as follows:

$$\begin{align*}
1 \text{ centimeter} &= 0.394 \text{ inches} \\
1 \text{ meter} &= 39.37 \text{ inches} \\
1 \text{ hectare} &= 2.471 \text{ acres} \\
1 \text{ kilogram} &= 2.205 \text{ pounds} \\
1 \text{ hectoliter} &= 2.838 \text{ pounds}
\end{align*}$$

$$\begin{align*}
\text{mm} &= \text{inches} \times 25.4 \\
\text{cm} &= \text{inches} \times 2.54 \\
\text{ha} &= \text{acres} \times 0.405 \\
\text{kg} &= \text{acres} \times 0.405 \\
\text{hl} &= \text{bushels} \times 0.352
\end{align*}$$

kilograms/hectoliter (kg/hl) = 1b/bu x 1.287
kilograms/hectare (kg/ha) = bu/A x 53.81 (48# bushel)
kilograms/hectare (kg/ha) = bu/A x 67.26 (60# bushel)

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<th>Knox County 1976</th>
<th>1977 average (2 tests)</th>
<th>Dakota County 1979</th>
<th>1976-79 average (4 tests)</th>
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<td></td>
<td>Yield bu/A (kg/ha)</td>
<td>Weight lb/bu (kg/hl)</td>
<td>Surv. %</td>
<td>Yield bu/A (kg/ha)</td>
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<td>42 (2820)</td>
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<td>30 (2020)</td>
<td>55.7 (71.7)</td>
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<td>-- (2820)</td>
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<td>95 (69)</td>
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<td>40 (2690)</td>
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<td>-- -- (2620)</td>
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<td>43 (2890)</td>
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<td>31</td>
<td>31 (2090)</td>
</tr>
<tr>
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Difference required significant at the 9.6% level for yield and weight with 646 and 726 degrees of freedom.

Table 6. Southeast and East Central District winter wheat variety tests. 1974-1979.

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Dif. sig. 6.3 (424) 6.2 (417) 9.3 (626) 5.1 (343) 6.0 (404) 5.1 (343) 3.9 (262) 0.8 (1.0)

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**Dif. sig.** 6.3 (424) 3.8 (256) 5.6 (377) N.S. 4.5 (303) 1.2 (1.5) 1.5 (1.9)

Table 8. Central District winter wheat variety tests. 1974-1979.

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Dif. sig. N.S. 7.0 (471) N.S. 6.1 (410) 5.3 (356) N.S. N.S. 1.0 (1.3)

Location of tests (Counties): 1974-1977 Custer; 1978 Sherman, Logan; 1979 Howard, Custer
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**Dif. sig.** N.S. 8.1 (545) 6.1 (410) 5.4 (363) 4.1 (276) 1.3 (1.7) 0.9 (1.2)

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Dif. sig. 3.6 (242) 4.1 (276) 3.7 (249) 3.8 (256) 5.4 (363) 5.3 (356) 2.9 (195) 0.8 (1.0)

Location of tests (counties): 1974 Cheyenne, Kimball, Box Butte (2), Sheridan; 1975 Cheyenne (2), Morrill, Box Butte, Dawes; 1976 Deuel, Cheyenne (2), Scotts Bluff, Box Butte, Sheridan; 1977 Kimball, Cheyenne, Morrill, Box Butte, Dawes; 1978 Garden, Cheyenne, Box Butte (2), Sheridan; 1979 Deuel, Cheyenne, Box Butte, Dawes.
Table 12. Test weight of winter wheat varieties in Nebraska tests. 1979.

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1/ Metric conversion for test weight 1.287 x lb/bu kilograms/hectoliter.
Table 13. Kernel weight of winter wheat varieties in Nebraska tests. 1979.

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Table 14. Protein content of winter wheat varieties in Nebraska tests. 1979.

| Variety       | Pawnee County | Polk County | Clay County | Webster County | Howard County | Custer County | Hitchcock County | Lincoln County | Perkins County | Deuel County | Box Butte County | Dawes County | Average 12 tests |
|---------------|---------------|-------------|-------------|----------------|--------------|---------------|------------------|----------------|---------------|-------------|-------------------|--------------|----------------|----------------|
| Agate         | 11.4          | 12.4        | 12.2        | 9.3            | 8.5          | 12.9          | 11.1             | 7.8            | 10.5          | 11.7        | 15.0              | 11.2         |                |
| Baca          | ----          | ----        | ----        | ----           | ----         | ----          | ----             | ----           | ----          | ----        | ----              | ----         |                |
| Bennett       | 11.7          | 11.6        | 12.4        | 9.7            | 8.9          | 12.7          | 11.7             | 12.0           | 8.7           | 11.0        | 13.2              | 14.3         | 11.5           |
| Buckskin      | 11.5          | 12.0        | 12.3        | 9.4            | 9.1          | 12.3          | 11.2             | 10.9           | 9.3           | 10.2        | 12.5              | 15.1         | 11.3           |
| Centurk       | 11.3          | 11.3        | 12.2        | 8.9            | 8.7          | 13.0          | 11.0             | 11.3           | 7.7           | 11.4        | 11.7              | 14.8         | 11.1           |
| Centurk 78    | 11.3          | 11.1        | 12.1        | 9.4            | 8.7          | 12.4          | 11.0             | 11.0           | 7.5           | 10.7        | 12.1              | 14.2         | 11.0           |
| Eagle         | ----          | 11.3        | 12.8        | 9.4            | 9.6          | 12.4          | 11.6             | 12.5           | 9.0           | ----        | ----              | ----         | ----           |
| Gage          | 11.7          | 11.6        | 12.9        | 9.7            | ----         | ----          | ----             | ----           | ----          | ----        | ----              | ----         | ----           |
| HiPlains      | ----          | ----        | ----        | ----           | 9.0          | 12.1          | 11.6             | 11.1           | 8.1           | 11.0        | 12.8              | 15.4         | ----           |
| Homestead     | 11.8          | 12.7        | 12.7        | 9.5            | ----         | ----          | ----             | ----           | ----          | ----        | ----              | ----         | ----           |
| Lancer        | 11.5          | 11.1        | 12.2        | 8.5            | 9.0          | 11.7          | 11.6             | 11.3           | 7.8           | 10.6        | 12.0              | 14.9         | 11.0           |
| Lancota       | 12.1          | 10.9        | 13.3        | 9.9            | 9.7          | 13.2          | 12.3             | 12.4           | 9.0           | 10.6        | 13.2              | 15.8         | 11.9           |
| Larned        | 11.0          | 12.3        | 12.1        | 8.5            | 8.8          | 12.2          | 11.4             | 11.6           | 8.0           | 10.2        | 13.0              | 14.2         | 11.1           |
| Lindon        | ----          | 11.2        | 12.5        | 9.5            | 8.9          | 12.4          | 11.3             | 11.3           | 8.4           | 10.6        | 12.6              | 14.6         | ----           |
| Sage          | 11.8          | 11.6        | 12.6        | 9.4            | 9.1          | 12.4          | 11.6             | 12.2           | 8.5           | 10.5        | 13.1              | 14.5         | 11.4           |
| Scout 66      | 11.0          | 12.3        | 12.2        | 8.6            | 9.5          | 12.5          | 11.3             | 11.7           | 8.4           | 10.6        | 12.9              | 14.4         | 11.3           |
| Scoutland     | 11.9          | 11.9        | 12.8        | 9.3            | ----         | ----          | ----             | ----           | ----          | ----        | ----              | ----         | ----           |
| Sentinel      | 12.2          | 10.8        | 12.4        | 9.6            | 9.3          | 13.0          | 11.9             | 12.3           | 8.5           | ----        | ----              | ----         | ----           |
| Turkey        | 12.6          | 12.2        | 13.1        | 10.0           | 9.6          | 13.8          | 12.6             | 11.5           | 8.3           | 11.9        | 12.8              | 16.0         | 12.0           |
| Vona          | ----          | 11.1        | 12.0        | 8.8            | 8.8          | 11.6          | 10.6             | 11.1           | 7.7           | 9.8         | 11.6              | 13.3         | ----           |
| Warrior       | ----          | ----        | ----        | ----           | 9.0          | 12.9          | 12.1             | 11.1           | 8.0           | ----        | ----              | ----         | ----           |
| Dif. sig.     | N.S.          | N.S.        | 0.4         | N.S.           | N.S.         | 0.7           | 0.6              | N.S.           | N.S.          | 1.1         | 0.8               | 0.3         |                |

Protein on 14% moisture basis.
Table 15. Protein content of winter wheat varieties in Nebraska tests. 1971-1979.

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<td>11.5</td>
<td>12.2</td>
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<td>12.7</td>
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<td>13.3</td>
<td>12.9</td>
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<tr>
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<td>12.8</td>
<td>12.9</td>
<td>13.1</td>
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<td>12.1</td>
<td>11.8</td>
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<td>12.6</td>
<td>13.1</td>
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<td>12.4</td>
<td>12.7</td>
<td>12.6</td>
<td>13.7</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Sentinel</td>
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<td>12.3</td>
<td>13.0</td>
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<td>12.0</td>
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<td>13.4</td>
<td>13.9</td>
<td>12.0</td>
<td>13.4</td>
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<td>----</td>
<td>----</td>
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<td>----</td>
<td>----</td>
<td>12.7</td>
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<tr>
<td>Average</td>
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<td>12.0</td>
<td>12.6</td>
<td>12.1</td>
<td>13.1</td>
<td>12.9</td>
<td>12.9</td>
<td>13.3</td>
<td>11.3</td>
<td>12.6</td>
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Dif. sig. | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.2 |

Protein on 14% moisture basis.
### Table 16. Height of winter wheat varieties in Nebraska tests, 1979.

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<tr>
<th>Variety</th>
<th>Plant height, inches (centimeters)</th>
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<td>Pawnee County</td>
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<tr>
<td>Agate</td>
<td>42 (107)</td>
</tr>
<tr>
<td>Baca</td>
<td>--</td>
</tr>
<tr>
<td>Bennett</td>
<td>36 (91)</td>
</tr>
<tr>
<td>Buckskin</td>
<td>43 (109)</td>
</tr>
<tr>
<td>Centurk</td>
<td>39 (99)</td>
</tr>
<tr>
<td>Centurk 78</td>
<td>38 (96)</td>
</tr>
<tr>
<td>Eagle</td>
<td>--</td>
</tr>
<tr>
<td>Gage</td>
<td>40 (102)</td>
</tr>
<tr>
<td>HiPlains</td>
<td>--</td>
</tr>
<tr>
<td>Homestead</td>
<td>35 (89)</td>
</tr>
<tr>
<td>Lancer</td>
<td>43 (109)</td>
</tr>
<tr>
<td>Lancota</td>
<td>40 (102)</td>
</tr>
<tr>
<td>Learned</td>
<td>39 (99)</td>
</tr>
<tr>
<td>Lindon</td>
<td>--</td>
</tr>
<tr>
<td>Sage</td>
<td>39 (99)</td>
</tr>
<tr>
<td>Scout 66</td>
<td>42 (107)</td>
</tr>
<tr>
<td>Scoutland</td>
<td>39 (99)</td>
</tr>
<tr>
<td>Sentinel</td>
<td>39 (99)</td>
</tr>
<tr>
<td>Turkey</td>
<td>46 (117)</td>
</tr>
<tr>
<td>Vona</td>
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</tr>
<tr>
<td>Warrior</td>
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</tr>
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<td>Dif. sig.</td>
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Table 17. Survival and lodging of winter wheat varieties in Nebraska tests. 1979.

<table>
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<th>Survival %</th>
<th>Lodging %</th>
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<td>Webster County</td>
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<tr>
<td>Agate</td>
<td>95</td>
<td>83</td>
</tr>
<tr>
<td>Baca</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Bennett</td>
<td>85</td>
<td>87</td>
</tr>
<tr>
<td>Buckskin</td>
<td>83</td>
<td>85</td>
</tr>
<tr>
<td>Centurk</td>
<td>78</td>
<td>86</td>
</tr>
<tr>
<td>Centurk 78</td>
<td>76</td>
<td>87</td>
</tr>
<tr>
<td>Eagle</td>
<td>66</td>
<td>87</td>
</tr>
<tr>
<td>Gage</td>
<td>69</td>
<td>83</td>
</tr>
<tr>
<td>HiPlains</td>
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<td>--</td>
</tr>
<tr>
<td>Homestead</td>
<td>71</td>
<td>86</td>
</tr>
<tr>
<td>Lancer</td>
<td>88</td>
<td>86</td>
</tr>
<tr>
<td>Lancota</td>
<td>66</td>
<td>89</td>
</tr>
<tr>
<td>Larned</td>
<td>73</td>
<td>90</td>
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<tr>
<td>Lindon</td>
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<td>Sage</td>
<td>70</td>
<td>85</td>
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<tr>
<td>Scout 66</td>
<td>74</td>
<td>85</td>
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<tr>
<td>Scoutland</td>
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<td>Sentinel</td>
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<td>86</td>
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<tr>
<td>Turkey</td>
<td>97</td>
<td>87</td>
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<tr>
<td>Vona</td>
<td>36</td>
<td>83</td>
</tr>
<tr>
<td>Warrior</td>
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</tr>
<tr>
<td>Dif. sig.</td>
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<td>N.S.</td>
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<tr>
<td>Variety</td>
<td>Surv. %</td>
<td>Yield bu/A (kg/ha)</td>
</tr>
<tr>
<td>-------------</td>
<td>---------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Kearney</td>
<td>94</td>
<td>53 (2850)</td>
</tr>
<tr>
<td>Nebar</td>
<td>81</td>
<td>72 (3870)</td>
</tr>
<tr>
<td>Paoli</td>
<td>85</td>
<td>69 (3710)</td>
</tr>
<tr>
<td>NE76103</td>
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<td>--</td>
</tr>
<tr>
<td>NE76129</td>
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<td>--</td>
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<tr>
<td>NE76138</td>
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<td>NE76145</td>
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</tr>
<tr>
<td>NE76162</td>
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</tr>
<tr>
<td>Centurk (w.w.)</td>
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Dif. req. sig. -- 9.5 (511) N.S. 11.1 (597) 15 11.5 (619) 15.3 8.9 (479) N.S. N.S.

1/ Hudson Sel/3/Sabbaton/Meimi//Decatur
2/ Sabbaton/Meimi//Decatur/3/Paoli
4/ Decatur/Chase/3/Sabbaton/Meimi//Will
5/ Decatur/Chase/3/Mo. 1222//Sabbaton/Meimi
6/ Decatur/Chase//OAC 2-11/Decatur
7/ Sabbaton/Meimi//Will/3/Sabbaton/Meimi//Decatur
Table 19. Winter barley variety tests. 1979.

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<th>Variety</th>
<th>Webster County</th>
<th>Perkins County</th>
<th>Cheyenne County</th>
<th>Average</th>
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<td>Survival %</td>
<td>Ldg. %</td>
<td>Yield bu/A (kg/ha)</td>
<td>Survival %</td>
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<tr>
<td>Kearney</td>
<td>11</td>
<td>73</td>
<td>39 (3000)</td>
<td>73</td>
</tr>
<tr>
<td>Nebar</td>
<td>4</td>
<td>2</td>
<td>27 (1450)</td>
<td>73</td>
</tr>
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<td>14</td>
<td>2</td>
<td>56 (3010)</td>
</tr>
<tr>
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<td>11</td>
<td>14</td>
<td>41 (2210)</td>
</tr>
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<td>18</td>
<td>9</td>
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<td>NE76156</td>
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<td>10</td>
<td>2</td>
<td>47 (2530)</td>
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<td>11</td>
<td>4</td>
<td>56 (3010)</td>
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<tr>
<td>Centurk w.w.</td>
<td>89</td>
<td>2</td>
<td>48 (3010)</td>
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Dif. sig. | 7.7 | 8.9 | 6.3 (339) | 15.0 | 8.2 (441) | N.S. | 19.0 (1020) | 1.9 (5) | 2.1 (2.7) |

1/ Hudson Sel/3/Sabbaton/Meimi//Decatur.
2/ Sabbaton/Meimi//Decatur/3/Paoli.
4/ Decatur/Chase/3/Sabbaton/Meimi//Will.
5/ Decatur/Chase/3/Mo. 1222//Sabbaton/Meimi.
7/ Sabbaton/Meimi//Will/3/Sabbaton/Meimi//Decatur.
The agricultural research division of the Institute of Agriculture and Natural Resources is the Nebraska Agricultural Experiment Station. The Experiment Station relies on its research centers and field laboratories to provide applied knowledge for development of Nebraska's largest industry—agriculture. In addition, many Nebraska farmers cooperate by furnishing land and other facilities for research projects. This provides information from areas not well represented by stations.

The Cooperative Extension Service transmits data to users through District and County Extension Offices. Area and County Extension Agents are available to provide additional interpretation and more specific recommendations.

Nebraska is a large state and has great variation due to topography and the continental type of climate. The elevation ranges from 1,000 feet to near a mile high in the northwest portion of the state, rainfall varies from 14 to 40 inches per year, and the soil types vary from sands to heavy clays. The research program thus is broad in subject matter and geography, resulting in the need for various stations and satellite locations.

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