WHEAT BREEDING
AT THE CENTRAL OREGON EXPERIMENT STATION

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ABSTRACT

A brief summary of spring wheat breeding trials is presented below, highlighting performance of some commercial varieties and several advanced breeding lines.

INTRODUCTION

The Central Oregon Experiment Station continues to be a vital link in the total Oregon State University wheat breeding and genetics program. During the past 25 years, the station has evaluated advanced selection of wheat for their adaptation to Central Oregon. In doing so, they have provided information to the growers in the area regarding the potential of new varieties. Madras is the initial site for planting and evaluating of the spring Durum lines from Mexico.

METHODS

In 1988, at the Madras experimental site, approximately 9.5 acres were planted with spring wheat and spring durum experimental lines. Two hundred and seventeen hard red spring wheat lines were yield tested with their appropriate check varieties. There were 178 soft and hard white spring lines in yield test. The number of spring durums in yield test at Madras equaled 200.

In addition to the lines tested for yield, there were nine observation nurseries (2 row plots). These nurseries originated at The International Maize and Wheat Improvement Center in Mexico (CIMMYT) and at The International Center for Agricultural Research in the Dry Areas in Syria (ICARDA). They constitute the major source of the spring wheat and spring durum program at OSU.

DISCUSSION

In Tables 1 and 2 yield and quality data for two advanced soft white lines are presented. These soft white lines are
compared to Twin, Dirkwin, and Owens. The experimental lines are superior in yield and equal in quality to the checks.

Table 1. 1988 crop yield data for two advanced soft white spring lines, Central Oregon Experiment Station, Madras, Oregon

<table>
<thead>
<tr>
<th>Location</th>
<th>Yield (bu/a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madras</td>
<td></td>
</tr>
<tr>
<td>ORS8501</td>
<td>90</td>
</tr>
<tr>
<td>4870442</td>
<td>94</td>
</tr>
<tr>
<td>Twin</td>
<td>87</td>
</tr>
<tr>
<td>Dirkwin</td>
<td>87</td>
</tr>
<tr>
<td>Owens</td>
<td>82</td>
</tr>
</tbody>
</table>

| Location average  | 88           |

Table 2. Quality data for two advanced soft white spring lines, Central Oregon Experiment Station, Madras, Oregon

<table>
<thead>
<tr>
<th>Test</th>
<th>Flour wt.</th>
<th>Flour yield</th>
<th>Flour protein</th>
<th>Cookie diameter</th>
<th>Cake volume</th>
<th>Cake score</th>
<th>Sponge cake</th>
<th>No. of years</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORS8501</td>
<td>64.02</td>
<td>70.6</td>
<td>9.0</td>
<td>9.0</td>
<td>1230**</td>
<td>69*</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>4870442</td>
<td>62.3</td>
<td>69.7</td>
<td>9.2</td>
<td>8.9</td>
<td>1205*</td>
<td>73*</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Twin</td>
<td>60.5</td>
<td>69.0</td>
<td>9.5</td>
<td>9.1</td>
<td>1183**</td>
<td>63**</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Dirkwin</td>
<td>59.9</td>
<td>69.3</td>
<td>9.5</td>
<td>8.8</td>
<td>1203**</td>
<td>66**</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Owens</td>
<td>62.7</td>
<td>69.0</td>
<td>9.5</td>
<td>9.1</td>
<td>1260**</td>
<td>73**</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

| Average       | 61.9      | 69.5        | 9.3           | 9.0            | 1216        | 69         |             |              |

* One year of data  
** Two years of data

Seven hard red spring cultivars are noted in Table 3. All were equal or superior to McKay in yield in 1988. The quality data are found in Table 4.
Table 3. Yield and agronomic data of seven advanced hard red spring lines, Central Oregon Experiment Station, Madras, Oregon

<table>
<thead>
<tr>
<th>Location</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madras</td>
<td>bu/a</td>
</tr>
<tr>
<td>McKay</td>
<td>89</td>
</tr>
<tr>
<td>ORS8510</td>
<td>90</td>
</tr>
<tr>
<td>4870355</td>
<td>94</td>
</tr>
<tr>
<td>4870456</td>
<td>95</td>
</tr>
<tr>
<td>4870475</td>
<td>99</td>
</tr>
<tr>
<td>4870293</td>
<td>91</td>
</tr>
<tr>
<td>4870396</td>
<td>96</td>
</tr>
<tr>
<td>4870400</td>
<td>98</td>
</tr>
<tr>
<td>4870401</td>
<td>96</td>
</tr>
<tr>
<td>Location average</td>
<td>94</td>
</tr>
</tbody>
</table>

Table 4. Quality data averaged over years for eight hard red spring lines and with check variety McKay, Central Oregon Experiment Station, Madras, Oregon

<table>
<thead>
<tr>
<th>Test</th>
<th>Flour Wt.</th>
<th>Flour Yield</th>
<th>Flour Protein</th>
<th>Mixing Time</th>
<th>Loaf Volume</th>
<th>Crumb No. of Score</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORS8510</td>
<td>62.5</td>
<td>69.8</td>
<td>11.5</td>
<td>4.0</td>
<td>964</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>4870355</td>
<td>64.6</td>
<td>69.2</td>
<td>13.1</td>
<td>2.7</td>
<td>1006</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4870456</td>
<td>64.6</td>
<td>70.9</td>
<td>10.6</td>
<td>3.2</td>
<td>989</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4870475</td>
<td>61.8</td>
<td>69.9</td>
<td>11.5</td>
<td>2.7</td>
<td>983</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4870293</td>
<td>65.2</td>
<td>70.9</td>
<td>10.5</td>
<td>2.6</td>
<td>844</td>
<td>5</td>
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<tr>
<td>4870396</td>
<td>64.0</td>
<td>71.5</td>
<td>10.2</td>
<td>4.3</td>
<td>873</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>4870400</td>
<td>66.0</td>
<td>71.3</td>
<td>9.9</td>
<td>3.1</td>
<td>826</td>
<td>2</td>
<td>1</td>
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<tr>
<td>4870401</td>
<td>63.2</td>
<td>70.0</td>
<td>10.0</td>
<td>3.6</td>
<td>850</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>McKay</td>
<td>62.6</td>
<td>71.6</td>
<td>10.9</td>
<td>4.3</td>
<td>995</td>
<td>3</td>
<td>34</td>
</tr>
<tr>
<td>Average</td>
<td>63.8</td>
<td>70.0</td>
<td>10.9</td>
<td>3.4</td>
<td>925</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Tables 5 and 6 list three hard white selections and compare their yield and quality with McKay. Though their yields are equivalent or better than McKay, their flour yield and loaf volumes appear to be somewhat lower. The yield of ORS8413 is more statistically significant than McKay.
Table 5. Yield data for three advanced hard red spring lines, Central Oregon Experiment Station, Madras, Oregon

<table>
<thead>
<tr>
<th></th>
<th>Yield bu/a</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORS8413</td>
<td>102</td>
</tr>
<tr>
<td>4870235</td>
<td>86</td>
</tr>
<tr>
<td>4870279</td>
<td>92</td>
</tr>
<tr>
<td>McKay</td>
<td>90</td>
</tr>
<tr>
<td>Location average</td>
<td>92</td>
</tr>
</tbody>
</table>

Table 6. Quality data for three hard white spring advanced lines, Central Oregon Experiment Station, Madras, Oregon

<table>
<thead>
<tr>
<th>Test Wt.</th>
<th>Flour Wt.</th>
<th>Flour Yield</th>
<th>Flour Protein</th>
<th>Mixing Time</th>
<th>Loaf Volume</th>
<th>Crumb Score</th>
<th>No. of Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>4870235</td>
<td>65.0</td>
<td>69.8</td>
<td>12.3</td>
<td>3.9</td>
<td>915</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4870279</td>
<td>63.7</td>
<td>68.9</td>
<td>12.8</td>
<td>4.4</td>
<td>981</td>
<td>3</td>
<td>2</td>
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<tr>
<td>ORS8413</td>
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<td>69.9</td>
<td>11.3</td>
<td>4.7</td>
<td>931</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>McKay</td>
<td>62.6</td>
<td>71.6</td>
<td>10.9</td>
<td>4.3</td>
<td>995</td>
<td>3</td>
<td>34</td>
</tr>
<tr>
<td>Average</td>
<td>63.7</td>
<td>70.1</td>
<td>11.7</td>
<td>4.5</td>
<td>969</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

The spring durum lines were very impressive in yield (Table 7) compared with WPB881, the check variety. The quality of these lines is being evaluated by the Pendleton Flour Mills and by the quality lab at OSU cereal project.

Table 7. 1988 yield data for five advanced spring durum lines grown in Madras and Pendleton, Oregon compared with WPB881

<table>
<thead>
<tr>
<th></th>
<th>Yield bu/a</th>
</tr>
</thead>
<tbody>
<tr>
<td>WPB881</td>
<td>69</td>
</tr>
<tr>
<td>4880139</td>
<td>91</td>
</tr>
<tr>
<td>4880142</td>
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</tr>
<tr>
<td>4880081</td>
<td>106</td>
</tr>
<tr>
<td>4880092</td>
<td>109</td>
</tr>
<tr>
<td>4880121</td>
<td>117</td>
</tr>
<tr>
<td>Location average</td>
<td>99</td>
</tr>
</tbody>
</table>