‘Flathead’ Winter Wheat

Phil Bruckner and Jim Berg, Winter Wheat Breeding Program, Montana State University
Updated January/2020

Flathead is a hard red winter wheat developed by the Montana Agricultural Experiment Station and available to certified seed growers in fall 2019. Flathead is derived from a composite of 2 crosses involving Yellowstone and a Washington State University line, PI 640431, that carries 2 stripe rust seedling resistance genes. Flathead is an early maturing (especially for a Montana line), hollow-stemmed, medium height wheat with white chaff (Table 2). Flathead has average yield, above average test weight, and average protein, with average winter survival. Flathead out-yields other early maturing varieties, such as Brawl CL Plus (Table 1). Flathead has excellent resistance to stripe rust and is moderately resistant to both stem rust and dwarf bunt. Flathead has medium PPO and above average milling and baking characteristics (Table 3). To be sold by variety name only as a class of certified seed. Montana State University Research Fees due on seed sold. PVP, Title V is pending.

Table 1. Yield of Flathead vs. a set of varieties, 2017-20191/

<table>
<thead>
<tr>
<th>Variety</th>
<th>Districts</th>
<th>All Locations</th>
<th>Relative maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>location-years</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Kalispell</td>
<td>2 Bozeman</td>
<td>3 Huntley</td>
</tr>
<tr>
<td>Brawl CL Plus</td>
<td>98.5</td>
<td>101.4</td>
<td>85.8</td>
</tr>
<tr>
<td>Flathead</td>
<td>121.6</td>
<td>128.0</td>
<td>90.8</td>
</tr>
<tr>
<td>SY Monument</td>
<td>102.6</td>
<td>122.2</td>
<td>92.6</td>
</tr>
<tr>
<td>Decade</td>
<td>91.7</td>
<td>99.8</td>
<td>101.7</td>
</tr>
<tr>
<td>FourOsix</td>
<td>110.8</td>
<td>122.5</td>
<td>88.0</td>
</tr>
<tr>
<td>Keldin</td>
<td>118.4</td>
<td>131.7</td>
<td>103.7</td>
</tr>
<tr>
<td>LCS Jet</td>
<td>134.0</td>
<td>138.7</td>
<td>102.2</td>
</tr>
<tr>
<td>Northern</td>
<td>108.7</td>
<td>127.8</td>
<td>94.5</td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td>27.1</td>
<td>24.6</td>
<td>7.1</td>
</tr>
</tbody>
</table>

**bold** = indicates highest value within a column

**bold** = indicates varieties with values equal to highest variety within a column based on Fisher's Protected LSD (p =0.05)

1/ = 2017-2019 Intrastate and 2018-2019 Off Station tests
2/ includes data from Billings, Fort Smith, Hardin area, Hysham, Molt, Rapelje
3/ includes data from Belt, Denton, Geraldine, Highwood, Winifred
5/ includes data from Choteau, Cut Bank, The Knees, Shelby
6/ includes data from Carter, Loma, Turner
Table 2. Agronomic characteristics of Flathead vs. a set of varieties, 2017-2018

<table>
<thead>
<tr>
<th>Variety</th>
<th>Test weight location-years</th>
<th>Winter survival %</th>
<th>Heading date Julian Calendar</th>
<th>Plant height in</th>
<th>Lodging %</th>
<th>Protein %</th>
<th>Sawfly cutting %</th>
<th>Stripe rust %</th>
<th>Coleoptile length in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brawl CL Plus</td>
<td>62.4</td>
<td>4</td>
<td>23</td>
<td>155.5</td>
<td>5</td>
<td>52</td>
<td>13.4</td>
<td>35</td>
<td>50</td>
</tr>
<tr>
<td>Flathead</td>
<td>61.6</td>
<td>50</td>
<td>157.7</td>
<td>7-Jun</td>
<td>29.6</td>
<td>12.7</td>
<td>11</td>
<td>3</td>
<td>2.6</td>
</tr>
<tr>
<td>SY Monument</td>
<td>60.4</td>
<td>52</td>
<td>159.8</td>
<td>9-Jun</td>
<td>28.5</td>
<td>7</td>
<td>12.0</td>
<td>51</td>
<td>4</td>
</tr>
<tr>
<td>Decade</td>
<td>60.9</td>
<td>59</td>
<td>160.6</td>
<td>10-Jun</td>
<td>31.0</td>
<td>8</td>
<td>13.0</td>
<td>39</td>
<td>41</td>
</tr>
<tr>
<td>FourOsix</td>
<td>61.0</td>
<td>46</td>
<td>161.4</td>
<td>10-Jun</td>
<td>29.2</td>
<td>6</td>
<td>12.6</td>
<td>58</td>
<td>6</td>
</tr>
<tr>
<td>Keldin</td>
<td>61.5</td>
<td>45</td>
<td>162.2</td>
<td>11-Jun</td>
<td>30.0</td>
<td>7</td>
<td>12.5</td>
<td>49</td>
<td>41</td>
</tr>
<tr>
<td>LCS Jet</td>
<td>58.6</td>
<td>19</td>
<td>162.5</td>
<td>12-Jun</td>
<td>26.9</td>
<td>4</td>
<td>12.3</td>
<td>51</td>
<td>2</td>
</tr>
<tr>
<td>Northern</td>
<td>61.0</td>
<td>40</td>
<td>164.0</td>
<td>13-Jun</td>
<td>30.1</td>
<td>11</td>
<td>12.8</td>
<td>49</td>
<td>8</td>
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<tr>
<td>LSD (0.05)</td>
<td>0.3</td>
<td>13</td>
<td>0.6</td>
<td>0.5</td>
<td>ns</td>
<td>0.2</td>
<td>9</td>
<td>23</td>
<td>0.2</td>
</tr>
</tbody>
</table>

1/ = 2017-2019 Intrastate and 2018-2019 Off Station tests
bold = indicates highest value within a column
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Table 3. Mill and bake characteristics of Flathead vs. a set of varieties, 2017-2018:
Intrastate Tests only

<table>
<thead>
<tr>
<th>Variety</th>
<th>PPO yield location-years</th>
<th>Kernel hardness</th>
<th>Flour yield %</th>
<th>protein %</th>
<th>Ash %</th>
<th>Mixograph tolerance (1-6)</th>
<th>mix time min</th>
<th>absorption %</th>
<th>Baking mix time min</th>
<th>absorption %</th>
<th>volume cc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brawl CL Plus</td>
<td>0.275</td>
<td>78.4</td>
<td>71.0</td>
<td>12.1</td>
<td>0.40</td>
<td>3.0</td>
<td>6.8</td>
<td>69.0</td>
<td>15.9</td>
<td>79.2</td>
<td>1066</td>
</tr>
<tr>
<td>Flathead</td>
<td>0.247</td>
<td>74.2</td>
<td>73.1</td>
<td>12.0</td>
<td>0.41</td>
<td>3.9</td>
<td>9.1</td>
<td>68.1</td>
<td>17.1</td>
<td>78.6</td>
<td>1068</td>
</tr>
<tr>
<td>FourOsix</td>
<td>0.246</td>
<td>77.7</td>
<td>72.4</td>
<td>12.3</td>
<td>0.42</td>
<td>2.6</td>
<td>5.2</td>
<td>67.8</td>
<td>10.3</td>
<td>77.8</td>
<td>1111</td>
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<tr>
<td>Northern</td>
<td>0.126</td>
<td>85.6</td>
<td>70.4</td>
<td>12.1</td>
<td>0.45</td>
<td>2.8</td>
<td>3.4</td>
<td>64.9</td>
<td>4.6</td>
<td>74.3</td>
<td>1075</td>
</tr>
<tr>
<td>Keldin</td>
<td>0.265</td>
<td>80.1</td>
<td>72.2</td>
<td>11.1</td>
<td>0.40</td>
<td>3.5</td>
<td>7.9</td>
<td>66.0</td>
<td>14.4</td>
<td>76.1</td>
<td>1018</td>
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<tr>
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<td>68.0</td>
<td>70.4</td>
<td>11.7</td>
<td>0.44</td>
<td>2.8</td>
<td>5.1</td>
<td>65.2</td>
<td>7.8</td>
<td>75.2</td>
<td>1014</td>
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<td>LSD (0.05)</td>
<td>0.044</td>
<td>5.2</td>
<td>0.8</td>
<td>0.5</td>
<td>0.02</td>
<td>0.7</td>
<td>1.4</td>
<td>1.8</td>
<td>2.8</td>
<td>2.0</td>
<td>32</td>
</tr>
</tbody>
</table>

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** Phil Bruckner and Jim Berg, Montana State University, Agricultural Experiment Station <http://plantsciences.montana.edu/crops>