Bearpaw is a solid-stemmed hard red winter wheat with improved yield potential (Tables 1, 2) relative to Rampart. Bearpaw was developed by the Montana Agricultural Experiment Station and released to seed growers in 2011. Bearpaw was derived from a composite of five F₁ crosses with a common parent, DMS/Rampart/‘Pronghorn’/3/’Rampart’ crossed to ‘Rampart’, ‘NuPlains’, and three Montana unreleased hollow experimental lines. Bearpaw is a white-glumed, semi-dwarf (Rht1) wheat with medium maturity. Bearpaw performs well in locations where sawfly cutting has occurred (Table 3). Stem solidness is similar to Rampart (Table 3). Bearpaw has average test weight and protein, and below average winter hardiness (Table 4). Bearpaw is susceptible to prevalent races of stripe and leaf rust, but resistant to stem rust. Bearpaw is a high PPO variety with average mill and bake properties (Table 5). Montana State University Research Fees due on seed sold. PVP, Title V has been issued (Certificate #201200407).

Judee is a solid-stemmed hard red winter wheat with improved yield potential (Tables 1, 2) relative to Rampart. Judee was developed by the Montana Agricultural Experiment Station and released to seed growers in 2011. Judee’s pedigree is ‘Vanguard’/‘Norstar’/‘Judith’ dwarf/3/ NuHorizon. Judee is a white-glumed, semi-dwarf (Rht1) wheat with medium maturity. Judee performs well in locations where sawfly cutting has occurred (Table 3). Stem solidness is good, intermediate between Rampart and Genou (Table 3). Judee has average test weight and protein, and below average winter hardiness (Table 4). Judee is susceptible to prevalent races of leaf rust and stem rust, but resistant to stripe rust. Judee is a high PPO variety with average mill and above average bake properties (Table 5). Montana State University Research Fees due on seed sold. PVP, Title V has been issued (Certificate #201200161).

Warhorse is a solid-stemmed hard red winter wheat with improved yield potential (Tables 1, 2) relative to Genou and Rampart. Warhorse was developed by the Montana Agricultural Experiment Station and released to seed growers in 2013. Warhorse was derived from a composite of three F₁ crosses with a common parent, ‘Nuplains’/MTS9862 (an experimental sawfly line) crossed to three Montana unreleased hollow- and solid-stemmed experimental lines. Warhorse is an awned, white-glumed, semi-dwarf (Rht1) wheat with medium maturity. Warhorse performs well in locations where sawfly cutting has occurred (Table 3). Stem solidness is similar to Bearpaw and Rampart (Table 3). Warhorse has average test weight and protein, and below average winter hardiness (Table 4). Warhorse is resistant to prevalent races of stripe and stem rust, but susceptible to leaf rust. Warhorse is a high PPO variety with average mill and below average bake properties (Table 5). 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 has been issued (Certificate #201400131).

### Table 1. Yield of Bearpaw, Judee, and Warhorse vs. a set of varieties, 2010-2017¹/²

<table>
<thead>
<tr>
<th>Variety</th>
<th>1 Kalispell</th>
<th>2 Bozeman²/</th>
<th>3 Huntley³/</th>
<th>4 Moccasin⁴/</th>
<th>5 Conrad⁵/</th>
<th>5 Havre⁶/</th>
<th>6 Sidney &amp; Williston</th>
<th>All Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warhorse</td>
<td>120.8</td>
<td>73.4</td>
<td>60.6</td>
<td>51.7</td>
<td>65.9</td>
<td>52.8</td>
<td>47.2</td>
<td>60.6</td>
</tr>
<tr>
<td>Judee</td>
<td>114.4</td>
<td>70.6</td>
<td>59.6</td>
<td>48.2</td>
<td>66.7</td>
<td>54.1</td>
<td>40.5</td>
<td>59.5</td>
</tr>
<tr>
<td>Decade</td>
<td>56.6</td>
<td>62.6</td>
<td>63.0</td>
<td>53.8</td>
<td>67.0</td>
<td>53.3</td>
<td>54.9</td>
<td>59.3</td>
</tr>
<tr>
<td>WB-Quake</td>
<td>115.7</td>
<td>69.0</td>
<td>58.5</td>
<td>47.9</td>
<td>64.5</td>
<td>54.0</td>
<td>48.3</td>
<td>58.9</td>
</tr>
<tr>
<td>Bearpaw</td>
<td>64.4</td>
<td>60.3</td>
<td>60.1</td>
<td>50.8</td>
<td>64.3</td>
<td>50.2</td>
<td>48.4</td>
<td>56.6</td>
</tr>
</tbody>
</table>

LSD (0.05) 21.1 2.1 2.2 2.0 NS 2.6 5.3 1.9

¹/ = includes 2012-17 Saw fly, 2010-17 Intrasate and 2011-17 Off Station tests
²/ includes data from Dry Creek, Willow Creek
³/ includes data from Billings, Forsyth, Fort Smith, Hardin area, Hysham, Lodge Grass, Molt, Rapelje
⁴/ includes data from Belt, Denton, Geraldine, Highwood, Winifred
⁵/ includes data from Choteau, Cut Bank, The Knees, Shelby
⁶/ includes data from Carter, Gilford, Loma, Turner

*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)
Table 2. Bearpaw, Judee, and Warhorse Yield Performance under Sawfly Pressure and % Sawfly Cutting (test average cutting >10%) and % Sawfly Cutting (2010-2017)

<table>
<thead>
<tr>
<th>Variety</th>
<th>Yield bu/a</th>
<th>Sawfly cutting %</th>
</tr>
</thead>
<tbody>
<tr>
<td>location-years</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Judee</td>
<td>55.2</td>
<td>16</td>
</tr>
<tr>
<td>Decade</td>
<td>53.8</td>
<td>32</td>
</tr>
<tr>
<td>WBQuake</td>
<td>53.0</td>
<td>12</td>
</tr>
<tr>
<td>Warhorse</td>
<td>52.4</td>
<td>4</td>
</tr>
<tr>
<td>Bearpaw</td>
<td>49.5</td>
<td>13</td>
</tr>
</tbody>
</table>

LSD (0.05) ns 7

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)

Table 3. Stem solidness ratings of Bearpaw, Judee, and Warhorse compared to other solid-stemmed varieties, (2013-2017)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Billings</td>
<td>Bozeman</td>
<td>Conrad</td>
<td>Havre</td>
<td>Moccasin</td>
<td></td>
</tr>
<tr>
<td>Warhorse</td>
<td>21.1</td>
<td>21.4</td>
<td>22.0</td>
<td>22.1</td>
<td>21.4</td>
<td>21.6</td>
</tr>
<tr>
<td>Bearpaw</td>
<td>19.8</td>
<td>20.6</td>
<td>19.9</td>
<td>21.5</td>
<td>22.2</td>
<td>20.6</td>
</tr>
<tr>
<td>WBQuake</td>
<td>20.2</td>
<td>20.3</td>
<td>19.2</td>
<td>21.0</td>
<td>20.5</td>
<td>20.2</td>
</tr>
<tr>
<td>Judee</td>
<td>18.4</td>
<td>19.8</td>
<td>19.3</td>
<td>20.8</td>
<td>21.1</td>
<td>19.7</td>
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<tr>
<td>Loma</td>
<td>19.3</td>
<td>17.7</td>
<td>17.2</td>
<td>20.1</td>
<td>18.9</td>
<td>20.2</td>
</tr>
</tbody>
</table>

LSD (0.05) 1.1 0.8 1.8 1.1 ns 0.6 ns 1.4 1.3 0.9 0.9

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/ includes Carter, Gildford, and Loma

Table 4. Agronomic characteristics of Bearpaw, Judee, and Warhorse vs. a set of varieties, 2010-2017

<table>
<thead>
<tr>
<th>Variety</th>
<th>Test weight survival</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</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>location-years 189</td>
<td>8</td>
<td>85</td>
<td>189</td>
<td>31</td>
<td>188</td>
<td>27</td>
<td>17</td>
<td>4</td>
</tr>
<tr>
<td>Bearpaw</td>
<td>59.1</td>
<td>47</td>
<td>162.4</td>
<td>11-Jun</td>
<td>30.4</td>
<td>26</td>
<td>13.0</td>
<td>9</td>
<td>61</td>
</tr>
<tr>
<td>Decade</td>
<td>59.3</td>
<td>61</td>
<td>161.8</td>
<td>12-Jun</td>
<td>31.2</td>
<td>19</td>
<td>13.0</td>
<td>24</td>
<td>62</td>
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<tr>
<td>Judee</td>
<td>60.0</td>
<td>30</td>
<td>162.8</td>
<td>12-Jun</td>
<td>31.0</td>
<td>23</td>
<td>13.1</td>
<td>12</td>
<td>12</td>
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<tr>
<td>Warhorse</td>
<td>59.5</td>
<td>48</td>
<td>163.9</td>
<td>13-Jun</td>
<td>30.7</td>
<td>13</td>
<td>13.2</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>WBQuake</td>
<td>59.5</td>
<td>46</td>
<td>164.8</td>
<td>14-Jun</td>
<td>31.1</td>
<td>21</td>
<td>12.9</td>
<td>10</td>
<td>22</td>
</tr>
</tbody>
</table>

LSD (0.05) 0.3 0.9 0.3 0.2 0.1 5 9 0.2

Table 5. Mill and bake characteristics of Bearpaw, Judee, and Warhorse, 2010-2016

<table>
<thead>
<tr>
<th>Variety</th>
<th>PPO 1/</th>
<th>Kernel hardness</th>
<th>Flour yield %</th>
<th>Protein %</th>
<th>Ash %</th>
<th>Mixograph tolerance (1-6)</th>
<th>Mixograph absorption min %</th>
<th>Baking mix time min</th>
<th>Absorption %</th>
<th>Volume cc</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>location-years 42</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td>42</td>
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<tr>
<td>Bearpaw</td>
<td>0.279</td>
<td>80.6</td>
<td><strong>69.0</strong></td>
<td>11.5</td>
<td>0.41</td>
<td>3.2</td>
<td>4.5</td>
<td>61.3</td>
<td>8.0</td>
<td>71.5</td>
</tr>
<tr>
<td>Decade</td>
<td>0.282</td>
<td>75.5</td>
<td>67.8</td>
<td>11.5</td>
<td>0.41</td>
<td>4.7</td>
<td>8.3</td>
<td><strong>64.9</strong></td>
<td>18.9</td>
<td>75.3</td>
</tr>
<tr>
<td>Judee</td>
<td>0.273</td>
<td>79.0</td>
<td>67.4</td>
<td>11.8</td>
<td>0.41</td>
<td>4.0</td>
<td>5.7</td>
<td>62.2</td>
<td>9.7</td>
<td>72.2</td>
</tr>
<tr>
<td>Warhorse</td>
<td>0.262</td>
<td>90.3</td>
<td>67.8</td>
<td>11.8</td>
<td>0.43</td>
<td>3.3</td>
<td>5.0</td>
<td>62.7</td>
<td>8.0</td>
<td>73.1</td>
</tr>
</tbody>
</table>

LSD (0.05) ns 1.8 0.5 0.2 0.01 0.30 0.6 0.8 1.3 0.8 23

1/ low is best for noodles

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