

# 'Bearpaw', 'Judee', and 'Warhorse' Winter Wheats

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 Small Grain QuickFacts: <http://plantsciences.montana.edu/FoundationSeed> (Updated 12/2017)

**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 F<sub>1</sub> 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 F<sub>1</sub> 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 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, 2010-2017<sup>1/</sup>**

Variety	Districts							All Locations
	1 Kalispell	2 Bozeman <sup>2/</sup>	3 Huntley <sup>3/</sup>	4 Moccasin <sup>4/</sup>	5 Conrad <sup>5/</sup>	5 Havre <sup>6/</sup>	6- Sidney & Williston	
location-years	7	17	46	41	34	35	11	191
<b>Warhorse</b>	<b>120.8</b>	<b>73.4</b>	60.6	51.7	65.9	<b>52.8</b>	47.2	<b>60.6</b>
<b>Judee</b>	<b>114.4</b>	<b>70.6</b>	59.6	48.2	66.7	<b>54.1</b>	40.5	<b>59.5</b>
<b>Decade</b>	56.6	62.6	<b>63.0</b>	<b>53.8</b>	67.0	<b>53.3</b>	<b>54.9</b>	<b>59.3</b>
<b>WB-Quake</b>	<b>115.7</b>	<b>69.0</b>	58.5	47.9	64.5	<b>54.0</b>	48.3	<b>58.9</b>
<b>Bearpaw</b>	64.4	60.3	60.1	50.8	64.3	50.2	48.4	56.6
<b>LSD (0.05)</b>	<b>21.1</b>	<b>6.1</b>	<b>2.2</b>	<b>2.0</b>	<b>NS</b>	<b>2.6</b>	<b>5.3</b>	<b>1.9</b>

**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 2012-17 Saw fly, 2010-17 Intrastate 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, Highway, Winifred

5/ includes data from Choteau, Cut Bank, The Knees, Shelby

6/ includes data from Carter, Gildford, Loma, Turner

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

Variety	Yield bu/a	Sawfly cutting %
location-years	18	18
<b>Judee</b>	55.2	16
<b>Decade</b>	53.8	32
<b>WBQuake</b>	53.0	12
<b>Warhorse</b>	52.4	<b>4</b>
<b>Bearpaw</b>	49.5	13
<b>LSD (0.05)</b>	<b>ns</b>	<b>7</b>

**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)**

	Stem Solidness Rating (scale 5-25, higher = more solid)						Stem Solidness by location, 2013-2017				
	2017	2016	2015	2014	2013	2013-17	Billings	Bozeman	Conrad	Havre <sup>1/</sup>	Moccasin
location-years	11	11	7	8	4	41	2	9	6	17	7
<b>Warhorse</b>	<b>21.1</b>	<b>21.4</b>	<b>22.0</b>	<b>22.1</b>	21.4	<b>21.6</b>	22.6	<b>19.6</b>	<b>21.7</b>	<b>22.1</b>	<b>22.5</b>
<b>Bearpaw</b>	19.8	20.6	19.9	<b>21.5</b>	22.2	20.6	21.8	17.7	<b>20.8</b>	<b>21.5</b>	21.4
<b>WBQuake</b>	<b>20.2</b>	20.3	19.2	21.0	20.5	20.2	21.9	17.2	<b>21.3</b>	20.8	21.5
<b>Judee</b>	18.4	19.8	19.3	20.8	21.1	19.7	22.0	16.9	<b>20.9</b>	20.0	20.6
<b>Loma</b>	19.3	17.7	17.2	<b>21.1</b>	20.1	18.9	22.8	15.7	18.7	20.2	19.1
<b>LSD (0.05)</b>	<b>1.1</b>	<b>0.8</b>	<b>1.8</b>	<b>1.1</b>	<b>ns</b>	<b>0.6</b>	<b>ns</b>	<b>1.4</b>	<b>1.3</b>	<b>0.9</b>	<b>0.9</b>

**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 ( $p=0.05$ )

<sup>1/</sup> includes Carter, Gildford, and Loma

**Table 4. Agronomic characteristics of Bearpaw, Judee, and Warhorse vs. a set of varieties, 2010-2017<sup>1/</sup>**

Variety	Test weight	Winter survival	Heading date		Plant height	Lodging	Protein	Saw fly cutting	Stripe rust	Coleoptile length
	lb/bu	%	Julian	Calendar	in	%	%	%	%	in
location-years	189	8	85		189	31	188	27	17	4
<b>Bearpaw</b>	59.1	47	162.4	11-Jun	30.4	26	13.0	9	61	3.0
<b>Decade</b>	59.3	<b>61</b>	161.8	12-Jun	31.2	<b>19</b>	13.0	24	62	3.0
<b>Judee</b>	<b>60.0</b>	30	162.8	12-Jun	31.0	23	<b>13.1</b>	12	<b>12</b>	3.7
<b>Warhorse</b>	59.5	48	163.9	13-Jun	30.7	<b>13</b>	<b>13.2</b>	<b>3</b>	<b>11</b>	3.3
<b>WBQuake</b>	59.5	46	164.8	14-Jun	31.1	<b>21</b>	12.9	10	22	2.7
<b>LSD (0.05)</b>	<b>0.3</b>	<b>9</b>	<b>0.3</b>		<b>0.2</b>	<b>7</b>	<b>0.1</b>	<b>5</b>	<b>9</b>	<b>0.2</b>

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

Variety	PPO <sup>1/</sup>	Kernel hardness	Flour			Mixograph			Baking		
			yield	protein	ash	tolerance	mix time	absorption	mix time	absorption	volume
			%	%	%	(1-6)	min	%	min	%	cc
location-years	42	42	42	42	42	42	42	42	42	42	42
<b>Bearpaw</b>	0.279	80.6	<b>69.0</b>	11.5	0.41	3.2	4.5	61.3	8.0	71.5	1000
<b>Decade</b>	0.282	75.5	67.8	11.5	<b>0.41</b>	<b>4.7</b>	8.3	<b>64.9</b>	18.9	<b>75.3</b>	1048
<b>Judee</b>	0.273	79.0	67.4	<b>11.8</b>	<b>0.41</b>	4.0	5.7	62.2	9.7	72.2	<b>1132</b>
<b>Warhorse</b>	0.262	90.3	67.8	<b>11.8</b>	0.43	3.3	5.0	62.7	8.0	73.1	1068
<b>LSD (0.05)</b>	<b>ns</b>	<b>1.8</b>	<b>0.5</b>	<b>0.2</b>	<b>0.01</b>	<b>0.30</b>	<b>0.6</b>	<b>0.8</b>	<b>1.3</b>	<b>0.8</b>	<b>23</b>

<sup>1/</sup> low is best for noodles