

Recommended Solid-Stemmed Winter Wheat Varieties

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 Small Grain QuickFacts: <http://plantsciences.montana.edu/FoundationSeed> (Updated 12/2016)

Description of selected varieties developed by MSU/MAES Winter Wheat Breeding Program:

Bearpaw – hard red winter wheat developed by the Montana Agricultural Experiment Station in 2011. Bearpaw is a white-glumed, solid-stem, semi-dwarf (*Rht1*) wheat with medium maturity. Bearpaw has average yield, test weight, and protein, and below average winter hardiness. Bearpaw is resistant to prevalent races of stem rust but susceptible to stripe and leaf rust. Stem-solidness of Bearpaw is most similar to Rampart. Bearpaw is a high PPO variety with above average milling and average baking properties. PVP, Title V option has been issued (Certificate #201200407).

Judee – hard red winter wheat developed by the Montana Agricultural Experiment Station in 2011. Judee is a white-glumed, solid-stem, semi-dwarf (*Rht1*) wheat with medium maturity. Judee has average yield, test weight, and protein, and below average winter hardiness. Judee is susceptible to prevalent races of stem and leaf rust but resistant to stripe rust. Stem-solidness of Judee is most similar to Genou. Judee is a high PPO variety with average mill and above average bake properties. PVP, Title V has been issued (Certificate #201200161).

Table 1. Yield of Recommended Solid-Stemmed Winter Wheat varieties, 2012-2016^{1/}

Shaded entries are MSU/MAES released varieties since 2011

Variety	Districts							All Locations
	1 Kalispell	2 Bozeman	3 Huntley ^{2/}	4 Moccasin ^{3/}	5 Conrad ^{4/}	5 Havre ^{5/}	6- Sidney & Williston	
location-years	3	8	14	16	10	18	4	73
Loma	137.5	86.9	62.9	57.2	81.0	56.9	47.7	67.6
Warhorse	129.5	78.4	59.0	54.5	67.7	57.1	41.1	62.8
Judee	126.9	75.0	55.8	49.6	76.6	58.1	39.9	62.0
WB-Quake	122.5	76.8	53.5	50.3	69.4	59.9	44.5	61.3
Bearpaw	72.2	66.7	56.9	52.7	70.5	53.8	43.0	58.0
Rampart	99.1	70.5	49.4	44.5	67.7	55.2	42.9	56.1
LSD (0.05)	36.3	7.6	3.5	3.5	6.7	ns	ns	2.8

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 2012-16 Sawfly , 2014-16 Intrastate and 2015-16 Off Station tests

2/ includes data from Billings, Fort Smith, Hardin area, Hysham, Molt, Rapelje

3/ includes data from Belt, Denton, Geraldine, Highwood, Winifred

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

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

Variety	Yield (bu/a)		Sawfly Cutting (%)	
	without 'Loma'	with Loma'	without 'Loma'	with Loma'
location-years	13	5	13	5
Bearpaw	53.3	56.9	12	16
Judee	58.9	65.6	15	19
Loma		64.6		19
Rampart	48.8	52.3	10	13
Warhorse	55.2	58.8	3	2
WBQuake	56.3	61.5	12	15
LSD (0.05)	5.3	ns	6	ns

Loma is a semi-solid stemmed hard red winter wheat with improved yield potential relative to other solid stemmed varieties. Loma was developed by the Montana Agricultural Experiment Station and released to seed growers in 2016. Loma (Yellowstone//MTS0112/MTS0125) was a cross between Yellowstone and 2 unreleased solid-stemmed experimental lines. Loma is an awned, white-glumed, medium short wheat with medium to late maturity. Loma performs well in locations where sawfly cutting has occurred. Stem solidness is less than to Judee and WB Quake. Loma has average test weight and protein, and average winter

hardiness (Table 4). Loma is resistant to prevalent races of stripe and stem rust, but susceptible to leaf rust. Loma is a medium low PPO variety with above average mill and bake properties. 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 will be applied for.

Table 3. Stem solidness ratings of solid-stemmed varieties, (2012-2016)

	Stem Solidness Rating (scale 5-25, higher = more solid)						Stem Solidness by location, 2012-2016				
	2016	2015	2014	2013	2012	2012-16	Billings	Bozeman	Conrad	Havre ^{1/}	Moccasin
location-years	11	7	8	4	4	34	1	8	4	14	7
Warhorse	21.4	22.0	22.1	21.4	19.3	21.4	24.6	20.0	21.9	21.7	21.9
Bearpaw	20.6	19.9	21.5	22.2	20.4	20.8	23.9	18.6	20.8	21.7	21.2
Rampart	20.6	18.7	21.4	22.0	20.4	20.5	24.4	17.1	21.4	21.5	21.6
Judee	19.8	19.3	20.8	21.1	17.9	19.9	23.4	17.4	21.0	20.5	20.2
WBQuake	20.3	19.2	21.0	20.5	17.5	19.9	24.7	17.1	20.9	20.6	20.5
Loma	17.7	17.2	21.1	20.1	17.3	18.6	23.0	16.4	17.9	19.9	18.5
LSD (0.05)	0.8	1.8	1.1	ns	1.6	0.6	ns	1.7	1.4	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 Recommended Solid-Stemmed Varieties, 2012-2016^{1/}

Variety	Test weight lb/bu	Winter survival %	Heading date		Plant height in	Lodging %	Protein %	Sawfly cutting %	Stripe rust %
			Julian	Calendar					
location-years	72	2	43		73	10	71	10	7
Bearpaw	58.4	84	159.7	9-Jun	31.5	35	12.6	9	56
Judee	59.9	40	160.0	9-Jun	31.9	29	12.7	11	10
Loma	59.0	89	162.4	11-Jun	30.9	32	12.5	12	11
Rampart	59.3	69	160.7	10-Jun	35.4	27	13.2	8	29
Warhorse	59.2	79	161.2	10-Jun	32.1	16	12.8	2	8
WBQuake	59.2	80	161.9	11-Jun	32.2	25	12.6	11	20
LSD (0.05)	0.4	21	0.4		0.4	ns	0.2	7	14

^{1/} = includes 2012-16 Sawfly , 2014-16 Intrastate and 2015-16 Off Station tests

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 5. Mill and bake characteristics of Recommended Solid-Stemmed Varieties, 2012-2015

Variety	PPO ^{1/}	Kernel hardness	Flour			Mixograph			Baking		
			yield %	protein %	ash %	tolerance (1-6)	mix time min	absorption %	mix time min	absorption %	volume cc
location-years	19	19	19	19	19	19	19	19	19	19	19
Bearpaw	0.255	81.9	69.6	12.2	0.42	3.2	4.4	61.8	7.4	71.9	1038
Judee	0.264	80.2	68.5	12.5	0.41	4.1	5.8	62.8	10.1	72.9	1180
Loma	0.173	81.2	70.8	11.9	0.41	4.3	6.5	64.2	16.6	75.2	1149
Warhorse	0.261	91.3	68.5	12.4	0.43	3.3	5.0	62.9	8.1	73.5	1091
LSD (0.05)	0.025	2.1	0.7	0.4	0.01	0.5	0.5	1.0	1.7	1.0	33

** = indicates highest value within a column

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

^{1/} polyphenol oxidase, low is best for noodles

Warhorse - is an awned, white glumed, solid-stemmed hard red winter wheat released in 2013 by the Montana Agricultural Experiment Station. Warhorse has medium maturity and has medium short, semi-dwarf height. Warhorse's winter hardiness, rated at 4 on 0-5 scale, is an improvement over other solid stem varieties. Stem solidness is similar to that of Bearpaw and Rampart, while sawfly cutting of stems is very low (similar to Rampart). Warhorse yield is similar to Judee, while test weight and protein are above average. Warhorse is resistant to both stem and stripe rust. Warhorse has acceptable mill and bake qualities. PVP, Title V has been issued (Certificate# 201400131).