Recommended Solid-Stemmed Winter Wheat Varieties

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Small Grain QuickFacts: http://plantsciences.montana.edu./FoundationSeed (Updated 12/2015)

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, 2010-2015[1/]

Shaded entries are MSU/MAES released varieties since 2011

Variety	Districts							All Locations
	1	2	3	4	5	5	6- Sidney &	
	Kalispell	Bozeman[2/]	Huntley[3/]	Moccasin[4/]	Conrad[5/]	Havre[6/]	Williston	
location-years	6	13	31	30	22	21	8	131
Warhorse	**119.8****	**70.8****	**61.8***	**48.6***	**63.3***	**51.7***	**49.9***	**60.2****
WB-Quake	**115.4***	**66.8***	**61.2***	46.0	**63.5***	**52.3***	**50.2***	**59.4***
Judee	**113.7***	**68.8***	**61.4***	44.7	**64.1****	**53.5****	41.4	**58.6***
Bearpaw	72.4	63.5	**63.3*****	**48.9****	**62.7***	**52.2***	**51.0****	57.9
Rampart	94.0	62.8	55.6	39.9	57.9	48.6	44.3	53.1
Genou	70.6	58.2	55.6	42.5	59.8	50.6	**47.0***	53.0
LSD (0.05)	**18.4**	**5.5**	**2.7**	**2.2**	**4**	**2.5**	**6.3**	**1.9**

** = 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/ = includes 2012-15 Sawfly , 2010-15 Intrastate and 2011-15 Off Station tests
2/ includes data from Dry Creek, Willow Creek
3/ includes data from Forsyth, Fort Smith, Hardin area, Hysham, Lodge Grass, Molt, Rapelje
4/ includes data from Belt, Denton, Geraldine, Winifred
5/ includes data from Choteau, Cut Bank, The Knees, Shelby
6/ includes data from Loma, Turner

Table 2. 'Solid' Varieties: Yield Performance under Sawfly Pressure and % Sawfly Cutting (2010-2015)

Variety	Yield (bu/a)					Sawfly Cutting (%)				
	Havre	Loma	Turner	Willow Creek	Aver-age	Havre	Loma	Turner	Willow Creek	Aver-age
location-years	2	6	2	1	11	2	6	2	1	11
Judee	72.6	54.3	38.2	**39.4***	**53.3****	5	19	**5***	**2***	13
WBQuake	70.9	55.1	39.2	30.9	**52.9***	3	14	**6***	**2***	10
Warhorse	70.8	54.3	31.6	**43.2****	**52.2***	2	**5****	**2****	**1****	**3****
Bearpaw	68.4	52.6	38.1	34.6	**51.2***	4	17	12	**2***	12
Genou	66.2	47.9	38.1	**36.2***	48.4	11	19	13	**2***	15
Rampart	62.7	48.3	33.1	29.7	46.4	5	**11***	**6***	1	8
LSD (0.05)	**ns**	**ns**	**ns**	**8.5**	**3.9**	**ns**	**8**	**9**	**7**	**5**

Table 3. Stem solidness ratings of solid-stemmed varieties, (2011-2015)

Variety	Stem Solidness Rating (scale 5-25, higher = more solid)						Stem Solidness by location, 2010-2015				
	2015	2014	2013	2012	2011	2011-15	Bozeman	Conrad	Havre	Loma	Moccasin
location-years	7	8	8	8	4	35	9	5	9	3	9
Warhorse	**22.0****	**22.1****	**22.0***	**20.4***	**21.5****	**21.6****	**20.1****	**22.4****	**22.6***	20.9	**21.9****
Bearpaw	19.9	**21.5***	**21.7***	**20.8***	**21.0***	**21.0***	**19.0***	**21.8***	**22.5***	21.3	**21.0***
Rampart	18.7	**21.4***	**22.1****	**21.0****	**21.0***	20.9	17.5	**21.9***	**23.0****	21.0	**21.5***
Judee	19.3	20.8	**21.0***	18.5	**20.2***	19.9	17.4	**21.1***	21.4	20.0	20.3
WB Quake	19.2	21.0	20.2	18.9	18.1	19.6	16.8	20.9	21.4	20.3	19.8
Genou	15.5	19.6	20.7	18.4	17.3	18.5	14.4	19.3	21.0	19.9	19.1
LSD (0.05)	**1.9**	**1.0**	**1.2**	**1.2**	**1.7**	**0.7**	**1.7**	**1.4**	**1.1**	**ns**	**1.0**

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

Table 4. Agronomic characteristics of Recommended Solid-Stemmed Varieties, 2010-2015[1/]

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	131	7	61		132	21	130	19	11	3
Bearpaw	59.1	48	164.9	14-Jun	30.5	23	13.3	8	52	3.0
Genou	59.3	44	165.8	15-Jun	34.4	27	13.5	10	51	4.1
Judee	**59.7****	31	165.2	14-Jun	31.1	**17***	13.4	8	**13***	3.7
Rampart	**59.5***	39	166.0	15-Jun	34.1	27	**13.9****	**5***	34	**4.4****
Warhorse	59.3	48	166.3	15-Jun	30.8	**10****	13.4	**3****	**11****	3.3
WBQuake	59.3	48	167.1	16-Jun	31.3	**15***	13.0	7	**21***	2.7
LSD (0.05)	**0.3**	**10**	**0.3**		**0.3**	**9**	**0.2**	**3**	**12**	**0.3**

1/ = includes 2012-15 Saw fly , 2010-15 Intrastate and 2011-15 Off Station tests
** = 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)

Table 5. Mill and bake characteristics of Recommended Solid-Stemmed Varieties, 2010-2014

Variety	PPO [1/]	Kernel hardness	Flour			Mixograph			Baking		
			yield	protein	ash	tolerance	mix time	absorption	mix time	absorption	volume
			%	%	%	(1-6)	min	%	min	%	cc
location-years	29	29	29	29	29	29	29	29	29	29	29
Bearpaw	0.270	82.6	**68.4***	11.6	**0.41***	3.4	4.6	61.0	7.5	71.1	1020
Genou	0.308	79.8	**68.5****	11.9	**0.41***	**4.0***	5.6	**63.3****	12.1	**73.4****	1097
Judee	0.277	80.1	66.7	11.8	**0.41****	**4.1****	5.5	61.7	8.6	71.8	**1141****
Warhorse	0.263	92.1	67.3	11.8	0.43	3.3	5.0	61.9	7.1	72.2	1076
LSD (0.05)	**0.020**	**2.1**	**0.6**	**ns**	**0.01**	**0.4**	**0.3**	**0.9**	**0.8**	**0.9**	**25**

** = 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).

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