

MSU/MAES Solid-Stemmed Winter Wheat Varieties

Phil Bruckner and Jim Berg, Winter Wheat Breeding Program, Montana State University
 Small Grain QuickFacts: <http://plantsciences.montana.edu/FoundationSeed> (Updated 12/2018)

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

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 Solid-Stemmed Winter Wheat varieties, 2016-2018^{1/}

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	2	4	8	6	7	11	5	43
Loma	111.3	116.8	97.2	63.5	72.5	62.6	50.0	76.4
Warhorse	107.2	103.1	99.1	63.0	62.4	58.5	46.8	72.5
Judee	103.9	105.1	93.0	61.0	67.4	58.2	44.9	71.6
WB4483	90.5	92.3	92.6	60.1	68.6	59.6	51.8	70.4
LSD (0.05)	ns	ns	ns	ns	4.6	ns	ns	3.0

bold = indicates highest value within a column

ns = non-significant

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

1/ = includes 2016-18 Intrastate, 2018 Off Station, and 2018 Saw fly tests

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

3/ includes data from Belt, Denton, Geraldine, Highway

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

5/ includes data from Big Sandy, Carter, Loma, Turner

Table 2. 'Solid' Varieties: Yield Performance under Sawfly Pressure (test average cutting >10%) and % Sawfly Cutting (2016-2018)

Variety	Yield bu/a	Sawfly Cutting (%)
location-years	10	10
Loma	64.7	32
Judee	59.1	41
WB4483	57.9	38
Warhorse	57.7	7
LSD (0.05)	4.4	12

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 is pending (Certificate# 201700021).

Table 3. Stem solidness ratings of solid-stemmed varieties, (2016-2018)

	Stem Solidness Rating (scale 5-25, higher = more solid)				Stem Solidness by location, 2016-2018				
	2018	2017	2016	2016-2018	Bozeman	Conrad	Ft Benton	Havre	Moccasin
location-years	9	5	5	19	4	3	3	6	3
Warhorse	22.5	20.9	21.4	21.8	21.2	22.2	20.6	22.4	21.8
Judee	22.3	17.6	19.6	20.4	18.8	21.1	20.1	20.6	21.5
Loma	22.5	18.3	17.3	20.0	19.0	20.0	18.4	21.9	19.8
WB4483	19.0	18.2	19.6	18.9	19.9	20.5	17.8	18.8	18.8
LSD (0.05)	1.4	1.6	1.0	1.1	ns	ns	ns	2.3	ns

bold = indicates highest value w ithin a column

ns = non-significant

bold = indicates varieties w ith values equal to highest variety w ithin a column based on Fisher's Protected LSD (p =0.05)**Table 4. Agronomic characteristics of Solid-Stemmed Varieties, 2016-2018^{1/}**

Variety	Test weight lb/bu	Winter survival %	Heading date		Plant height in	Lodging %	Protein %	Saw fly cutting %	Stripe rust %	Coleoptile length in
			Julian	Calendar						
location-years	43	2	24		42	3	42	12	4	1
Judee	61.6	36	158.1	7-Jun	31.1	11	13.1	35	13	3.7
Loma	60.3	43	160.5	10-Jun	29.4	17	12.7	27	13	2.8
Warhorse	60.8	51	159.2	8-Jun	30.4	5	13.2	6	13	3.2
WB4483	60.4	47	160.3	9-Jun	30.0	29	13.0	32	62	2.8
LSD (0.05)	0.4	ns	0.4		0.5	ns	0.2	11	17	0.2

^{1/} = includes 2016-18 Intrastate, 2018 Off Station, and 2018 Saw fly tests

ns = non-significant

bold = indicates highest value w ithin a column**bold** = indicates varieties w ith values equal to highest variety w ithin a column based on Fisher's Protected LSD (p =0.05)**Table 5. Mill and bake characteristics of Solid-Stemmed Varieties, 2016-2017**

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	8	8	8	8	8	8	8	8	8	8	
Judee	0.241	76.5	70.0	11.7	0.42	3.5	4.9	64.0	9.7	73.6	1094
Loma	0.153	77.3	71.3	11.1	0.42	3.0	7.0	65.8	15.3	76.3	1062
Warhorse	0.251	86.5	69.5	11.9	0.44	2.4	4.4	65.3	7.5	75.3	1053
WB4483	0.353	76.0	71.0	11.5	0.40	2.9	6.5	66.0	14.9	76.0	1014
LSD (0.05)	0.030	4.3	1.1	ns	0.02	ns	1.1	ns	3.3	ns	ns

bold = indicates highest value w ithin a column

ns = non-significant

bold = indicates varieties w ith values equal to highest variety w ithin a column based on Fisher's Protected LSD (p =0.05)^{1/} 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).