

‘Judee’ and ‘Warhorse’ Winter Wheats

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

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. 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. 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 Judee and Warhorse vs. Decade, 2010-2018^{1/}

Variety	Districts							All Locations
	1 Kalispell	2 Bozeman ^{2/}	3 Huntley ^{3/}	4 Moccasin ^{4/}	5 Conrad ^{5/}	5 Havre ^{6/}	6- Sidney & Williston	
location-years	8	19	52	45	39	42	13	218
Warhorse	117.2	78.4	64.8	52.7	63.9	53.4	48.7	62.1
Judee	111.9	77.0	62.9	49.6	66.9	54.4	42.8	61.0
Decade	55.6	70.2	67.1	54.8	66.2	53.9	55.5	61.0
LSD (0.05)	19.0	6.5	2.3	1.9	ns	ns	5.4	ns

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 2012-18 Saw fly , 2010-18 Intrastate and 2011-18 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 Big Sandy, Carter, Gildford, Loma, Turner

Table 2. Judee and Warhorse Yield Performance under Sawfly Pressure and % Sawfly Cutting (test average cutting $\geq 10\%$) and % Sawfly Cutting (2010-2018)

Variety	Yield bu/a	Sawfly cutting %
location-years	26	26
Judee	56.4	26
Decade	55.0	37
Warhorse	54.0	5
LSD (0.05)	ns	7

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 3. Stem solidness ratings of Judee and Warhorse compared to other solid-stemmed varieties, (2015-2018)

	Stem Solidness Rating (scale 5-25, higher = more solid)					Stem Solidness by location, 2015-2018				
	2018	2017	2016	2015	2015-18	Billings	Bozeman	Conrad	Havre ^{1/}	Moccasin
location-years	9	11	6	3	29	2	6	4	14	3
Judee	22.3	18.4	20.0	19.4	20.1	22.0	17.4	21.5	20.2	21.7
Loma	22.5	19.3	17.9	17.3	19.8	22.8	16.7	20.1	20.7	19.8
MTS1588	23.8	22.8	22.3	22.0	22.9	23.0	22.6	23.0	23.1	22.5
Warhorse	22.5	21.1	21.4	21.9	21.7	22.6	20.5	21.8	22.0	22.2
LSD (0.05)	ns	1.3	2.0	ns	0.8	ns	2.3	ns	1.1	ns

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)

1/ includes Big Sandy, Carter, Gildford, and Loma

Table 4. Agronomic characteristics of Judee and Warhorse vs. Decade, 2010-2017^{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	216	9	96		216	33	215	37	17	4
Decade	59.5	62	161.5	11-Jun	31.1	18	13.0	28	62	3.0
Judee	60.3	32	162.5	12-Jun	30.9	22	13.2	19	12	3.7
Warhorse	59.7	49	163.7	13-Jun	30.6	12	13.3	4	11	3.3
LSD (0.05)	0.3	10	0.3		0.2	6	0.1	6	8	0.2

1/ = includes 2012-18 Saw fly , 2010-18 Intrastate and 2011-18 Off Station tests

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 Judee and Warhorse , compared to Decade, 2010-2017

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	53	53	53	53	53	53	53	53	53	53	53
Decade	0.282	76.5	68.3	11.7	0.41	4.3	8.4	66.1	19.1	76.6	1054
Judee	0.268	79.3	68.0	12.0	0.41	3.8	5.6	62.9	9.3	72.9	1141
Warhorse	0.261	90.1	68.1	12.1	0.43	3.0	5.0	63.8	7.8	74.0	1078
LSD (0.05)	0.014	1.5	ns	0.2	0.01	0.3	0.6	0.7	1.2	0.8	19

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)

^{1/} low is best for noodles