

Recommended Hollow-Stemmed Winter Wheat Varieties

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

Colter – is an awned, white glumed, high yielding hard red winter wheat to be released in fall 2013 by the Montana Agricultural Experiment Station. Colter is similar to Yellowstone for grain yield and most agronomic traits with the exception that Colter is about 0.5 lb/bu higher for test weight and has superior stem rust resistance relative to Yellowstone. Colter is moderately resistant to stripe rust, but susceptible to leaf rust. Colter has excellent milling and baking bread quality, similar to Yellowstone. PVP, Title V has been applied for (Certificate# 201500029).

Decade – hard red winter wheat developed by the Montana Agricultural Experiment Station and released jointly with North Dakota (pending at publication) in 2010. Decade is an early to medium maturing reduced height wheat with white chaff. Decade is a high yielding wheat with good winter hardiness and medium to high test weight and protein. Decade is resistant to prevalent races of stem and stripe rust. Decade has excellent milling and baking quality. PVP, Title V has been issued (Certificate #201100096).

Northern is a hard red winter wheat developed by the Montana Agricultural Experiment Station and released to growers in fall 2015. Northern was named to commemorate the 100th anniversary of the Northern Agricultural Research Center (NARC) in Havre, Montana. Northern is a medium-late maturing, medium-short statured wheat, with white chaff. Northern has average yield (similar to Yellowstone and Colter), average test weight, and average protein. Northern is resistant to both stem and stripe rust. Northern has above average milling and average baking properties (Table 3.) Northern is a low PPO cultivar with favorable Asian noodle color stability and noodle score. Plant Variety Protection is pending.

SY Clearstone 2CL – a 2-gene CLEARFIELD hard red winter wheat developed by Montana Agricultural Experiment Station in 2012 and licensed exclusively to Syngenta Seeds. SY Clearstone wheat 2CL is very similar to Yellowstone. It is a medium maturing, medium tall, white chaffed wheat with average winter hardiness. It is a high yielding wheat with average test weight and protein. SY Clearstone 2CL is resistant to stripe rust and has moderate resistance to stem rust, the latter an improvement over Yellowstone. SY Clearstone 2CL is a medium PPO variety with average mill and above average bake properties. PVP, Title V has been issued (Certificate# 201300357). Additionally, the CLEARFIELD genes are patented.

Table 1. Yield of Recommended Hollow-Stemmed Winter Wheat varieties, 2012-2015^{1/}

Shaded entries are MSU/MAES released varieties since 2010

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	4	4	18	17	13	9	5	70
Yellowstone	122.4*	91.7**	68.1*	56.5**	76.4**	56.4*	58.4	69.1**
Colter	132.3**	87.9*	70.0**	53.3	72.7*	55.2*	57.0	68.2*
Northern	116.7*	87.6*	68.5*	55.6*	73.9*	57.6**	52.4	67.6*
WB3768 (HWW)	126.6*	88.8*	67.2*	53.6*	74.5*	55.7*	55.8	67.6*
SY Clearstone 2CL	118.0*	88.4*	66.4*	53.0	72.8*	56.7*	48.7	66.0
CDC Falcon	82.4	75.4	65.3	52.2	69.4	55.3*	55.8	62.4
Decade	58.5	77.2	65.1	53.4	71.4	52.5	50.3	61.1
Jerry	59.7	73.9	61.0	49.4	65.7	48.6	57.5	57.9
LSD (0.05)	17.7	12.7	4.5	2.8	4	4.2	ns	3.0

** = 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/ = 2012-2015 Intrastate and 2013-2015 Off Station tests

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

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

4/ includes data from Choteau, The Knees, Shelby

5/ includes data from Loma, Turner

Table 2. Agronomic characteristics of Recommended Hollow-Stemmed Varieties, 2012-2015^{1/}

Variety	Test weight lb/bu	Winter survival %	Heading date		Plant height in	Lodging %	Protein %	Sawfly cutting %	Stripe rust %	Coleoptile length in
			Julian	Calendar						
location-years	70	5	35		69	11	69	7	6	2
CDC Falcon	58.9	62*	161.4	10-Jun	29.6	8	12.9	6	48	2.9
Colter	59.6*	57*	163.6	13-Jun	33.1	12	13.0*	15	21*	2.9
Decade	59.1	59*	160.6	10-Jun	31.4	14	13.2**	10	70	3.2
Jerry	58.4	66**	162.7	12-Jun	35.4	16	13.1*	10	75	3.2
Northern	59.4	49	163.9	13-Jun	31.5	14	13.1*	8	18**	2.5
SY Clearstone 2CL	58.7	44	163.0	12-Jun	33.6	14	12.8	11	30*	3.0
WB3768	59.9**	57*	165.6	15-Jun	35.2	19	12.8	17	23*	2.8
Yellowstone	59.2	54	163.0	12-Jun	33.3	12	12.7	9	28*	2.7
LSD (0.05)	0.4	11	0.5		0.5	ns	0.2	4	15	0.2

^{1/} = 2012-2015 Intrastate and 2013-2015 Off Station tests

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Table 3. Mill and bake characteristics of Recommended Hollow-stemmed Varieties, 2012-2014

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	12	12	12	12	12	12	12	12	12	12	12
Colter	0.280	82.2	68.6*	11.8*	0.42*	5.1**	9.2	64.8*	17.4	75.8*	1066
Decade	0.307	79.5	68.4*	12.1*	0.42**	4.8*	7.7	65.8**	17.4	75.9**	1093*
Northern	0.110*	88.4	68.9*	12.1**	0.45	3.8	4.1	62.3	6.0	72.2	1117**
SY Clearstone 2CL	0.316	80.5	67.4	11.5	0.44	4.2	6.5	62.1	9.7	72.2	1077
WB3768	0.109**	80.6	68.5*	11.8*	0.43*	4.5	6.3	63.2	12.7	73.7	1039
Yellowstone	0.205	82.5	69.0**	11.7	0.43*	4.8*	8.5	64.3	15.1	74.8	1092*
LSD (0.05)	0.040	2.6	0.7	0.3	0.01	0.5	1	1.1	1.9	1.1	31

** = 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

WB3768 – is a white-chaffed hard white winter wheat developed by the Montana Agricultural Experiment Station and licensed exclusively to WestBred/Monsanto in 2013. WB3768 is a high yielding variety similar to Yellowstone. WB3768 is similar to Yellowstone for most agronomic traits with the exception of higher test weight and later heading date and maturity. WB3768 is 1.8 inches taller than Yellowstone. Like Yellowstone, WB3768 is resistant to prevalent races of stem rust, but susceptible to stem and leaf rust. WB3768 has acceptable milling and baking quality. WB3768 is a low PPO cultivar with favorable Asian noodle color stability and noodle score. PVP, Title V has been applied for (Certificate# 201500028).

Yellowstone – hard red winter wheat developed by the Montana Agricultural Experiment Station and released to seed growers in 2005. Yellowstone is a very high yielding winter hardy variety with medium test weight, maturity, height, and grain protein. Yellowstone has excellent baking and good Asian noodle quality. It is moderately resistant to TCK smut and resistant to stripe rust, but susceptible to stem rust. Yellowstone has been the leading winter wheat variety planted in Montana since 2012. PVP, Title V has been issued (Certificate #200600284).