

'SY Clearstone 2CL' Winter Wheat

Phil Bruckner and Jim Berg, Winter Wheat Breeding Program, Montana State University
Updated 12/2015

SY Clearstone 2CL is a 2-gene CLEARFIELD hard red winter wheat developed by Montana Agricultural Experiment Station in 2012 and licensed exclusively to Syngenta Seeds. SY Clearstone 2CL wheat 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 (Tables 1,2) with average test weight and protein (Table 3). SY Clearstone 2CL has improved yield over another commercial 2-gene CLEARFIELD variety, AP503 CL2 (Table 2). 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 (Table 4). PVP, Title V has been issued (Certificate# 201300357). Additionally, the CLEARFIELD genes are patented.

Table 1. Yield of SY Clearstone 2CL vs. a set of recommended varieties, 2012-2015^{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	4	6	24	21	16	11	5	87
Yellowstone	122.4*	73.2*	66.5*	54.5**	70.6**	53.7*	58.4	65.3**
Colter	132.3**	69.2*	67.5**	52.4*	68.0*	52.5*	57.0	64.5*
SY Clearstone 2CL	118.0*	75.6**	65.6*	52.2*	67.8*	53.7**	48.7	63.4*
CDC Falcon	82.4	59.9	64.3*	51.2	65.2	51.9*	55.8	59.8
Decade	58.5	63.8	63.9*	52.3*	66.9	49.7	50.3	58.8
Jerry	59.7	60.3	58.5	48.0	60.6	45.8	57.5	54.9
LSD (0.05)	18.7	10.4	3.9	2.6	3.5	3.7	ns	2.7

** = 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 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, The Knees, Shelby

6/ includes data from Loma, Turner

Table 2. Yield of SY Clearstone 2CL vs. a set of CLEARFIELD varieties: 2015 Intrastate Test

Variety	Districts							All Locations
	1 Kalispell	2 Bozeman	3 Huntley ^{7/}	4 Moccasin	5 Conrad	5 Havre	6- Sidney & Williston	
location-years	1	1		1	1	1	1	6
SY Clearstone 2CL	132.0**	82.6**		56.9	83.0*	58.0**	45.7**	76.4**
Brawl CL Plus	90.5	71.3		50.1	85.7**	52.3*	25.5	62.6*
WB4623CLP	115.9	72.7*		47.7	67.1	55.0*	14.4	62.1*
WB4059CLP	61.6	56.2		48.9	65.4	48.3	21.6	50.3
LSD (0.05)	12.6	11.0		ns	16.6	5.7	13.7	14.7

7/ = not planted in 2015

Table 3. Agronomic characteristics of SY Clearstone 2CL vs. a set of recommended 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	87	5	35		86	13	86	10	6	2
CDC Falcon	58.6	62*	161.4	10-Jun	29.2	7	13.1	16	48	2.9
Colter	59.2**	57*	163.6	13-Jun	32.6	13	13.3*	23	21**	2.9
Decade	58.9*	59*	160.6	10-Jun	30.9	14	13.4**	18	70	3.2
Jerry	58.1	66**	162.7	12-Jun	34.7	20	13.4*	21	75	3.2
SY Clearstone 2CL	58.3	44	163.0	12-Jun	33.2	15	13.1	20	30*	3.0
Yellowstone	58.8	54	163.0	12-Jun	32.6	12	13.0	19	28*	2.7
LSD (0.05)	0.4	12	0.5		0.4	ns	0.2	ns	14	0.2

^{1/} = 2012-2015 Intrastate and 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 4. Mill and bake characteristics of SY Clearstone 2CL vs. a set of recommended varieties, 2012-2014

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	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
SY Clearstone 2CL	0.316	80.5	67.4	11.5	0.44	4.2	6.5	62.1	9.7	72.2	1077
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)	0.044	2.3	0.7	0.4	ns	0.5	1.2	1.2	1.9	1.2	ns

** = 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/} low is best for noodles