

**Project Title:** 2015 Intra-State Winter Wheat Variety Performance

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**Project Personnel:**

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**Objectives:**

To evaluate new and existing winter wheat lines and varieties in dryland under various growing conditions in Montana and Western North Dakota.

**Results:**

The 2015 Intrastate Winter Wheat Evaluation nursery was grown at Bozeman, Havre, Sidney, Kalispell, Moccasin, and Conrad, Montana and Williston, North Dakota. Most locations started the crop year with good September moisture and conditions varied widely across the rest of the year crop. Warm January temperatures and snow melt, followed by a cold February contributed to varying degrees of winter kill. The Sidney was not harvested due to winter kill. Huntley is under glyphosate tolerant wheat quarantine.

The overall mean yield, across the six harvested locations, was 70.9 bu/s. 20 Bu/a less than 2014. NWARC had the high mean yields at 115 bu/a. Twenty six entries had six location mean yields similar MT1078, the overall high yielder at 79 bu/a. SY Clearstone was the top named cultivar (Table 1). Overall test weight mean was 59.9 and ranged from 61.6 to 57.8 lbs./bu. T158 and LCS Mint had the high test weights at 61.6 lbs./bu (Table 2). MTF1232(F=forage) averaged 13.8% and WB4059CLP averaged 13.6% protein across six locations for high average and the overall protein mean was 12.6% (Table 3). The range of average heading dates was 10 days, 151.1 to 161.7, with `TB58' having the earliest average head date (Table 4). Average plant height ranged from 28.9" for WB405059CLP to 43.7" for MTF1232 (Table 5). MSU development line MTS1305 and Warhorse four location stem solidness scores were significantly (0.05) more than ten other scored lines (Table 6). Nine stripe rust infection evaluations are presented in Table 7. Colter, Judee, Northern, Warhorse along with several public and private development lines exhibited good stripe rust resistance at both Kalispell and Bozeman locations..

**Summary:**

The development of improved winter wheat lines and cultivars continues with improvements in yield, disease resistance and tolerance advances, combined with improved stem solidness to combat sawfly. New challenges arrive or former pest mutate to circumvent the remedies developed to thwart their damage and renew their attack on winter wheat and other crop species.

**Future Plans:** The intra-state winter wheat trial is not a component of the research center's "umbrella" project. This information is presented here for the convenience of the Mt Wheat & Barley Committee and the growers who generate the MWBC check-off dollars. Associate winter wheat breeder, Dr. Jim Berg, assembles the tables and only minor reformatting is done for this report.

Table 1. 2015 Montana Intrastate Winter Wheat Test (Exp. 35): Multi-Location Yield (bu/a)

Cultivar/Line	Bozeman LAT	Havre LAT	Sidney winter- killed	Williston RCB	Kalispell LAT	Moccasin LAT	Huntley not planted	Conrad LAT	6 Loc Avg.
lattice efficiency	161%	175%			187%	199%		137%	
+ MT1332	88.6*	66.4*		57.3*	144.8*	58.8*		87.3*	83.9**
MT1257	87.7*	64.2		51.5*	144.3*	68.0*		82.3*	83.0*
Yellowstone	84.4	65.2		64.2**	140.5	59.2*		83.1*	82.8*
MT1138	87.0*	65.4		52.4*	143.5*	69.0**		76.8	82.4*
+ MT1356	85.7*	63.3		50.6*	149.7*	56.7		87.2*	82.2*
MTCL1131	85.1	57.6		55.4*	140.6	62.6*		89.0*	81.7*
Colter	87.0*	65.1		48.4	151.2*	57.9		79.6*	81.5*
+ MT1354	82.6	65.7		52.1*	154.6**	56.3		72.6	80.7*
Northern	83.1	61.2		50.5	130.8	64.2*		87.9*	79.6*
+ MT1348	89.9*	67.4*		38.4	132.9	59.6*		89.9*	79.5*
MTS1224	89.9*	55.5		52.1*	144.7*	54.3		80.7*	79.5*
+ d MT1361	75.8	64.2		51.0*	123.7	66.5*		89.5*	78.5*
d MT1078	83.7	65.9		42.8	139.0	60.1*		75.2	77.8*
MT1265	82.1	58.3		48.4	139.8	56.9		80.4*	77.7*
WB3768	79.3	63.0		53.2*	135.8	59.5*		74.9	77.6*
d MT1117	82.6	60.5		46.5	138.7	61.0*		72.2	76.9*
SY Clearstone 2CL	82.6	58.0		45.7	132.0	56.9		83.0*	76.4*
#+ SY Monument	85.9*	65.9		40.8	121.5	59.8*		83.9*	76.3*
+ d MTCL1329	79.8	62.9		46.2	126.4	65.4*		73.9	75.8*
d MT1286	77.6	61.5		54.3*	113.5	58.2		89.0*	75.7*
Freeman	83.8	57.4		45.0	120.3	55.3		89.3*	75.2*
# Keldin	85.1	61.4		28.1	122.3	61.5*		89.8*	74.7*
# T158	95.3*	55.7		35.6	119.0	54.9		83.4*	74.0*
# d LCS Mint	83.5	55.5		29.9	119.4	56.5		95.2*	73.3*
#+ SY Sunrise	96.5**	64.1		24.2	111.3	55.8		82.4*	72.4*
# SY Wolf	83.2	59.9		35.9	105.7	52.5		90.8*	71.3*
#+ d Denali	50.2	72.1**		39.8	94.1	62.0*		95.9**	69.0
Warhorse	69.8	60.3		40.8	132.4	51.9		58.2	68.9
d MTS0826-63	70.7	57.7		54.9*	126.1	38.8		64.8	68.8
# WB4614	62.0	59.9		43.9	106.9	57.4		75.5	67.6
d MTCS1204	59.2	61.7		48.7	108.3	52.7		72.7	67.2
CDC Falcon	55.4	66.3		54.8*	89.2	54.4		81.8*	67.0
#+ Byrd	57.2	70.5*		49.3	85.9	61.4*		74.4	66.5
WB-Quake	64.9	57.1		47.3	127.5	46.5		54.3	66.3
Cowboy	56.4	71.7*		28.7	91.7	62.6*		83.6*	65.8
d Ledger	49.5	63.7		45.5	104.6	48.2		77.4	64.8
Judee	64.6	60.5		27.9	125.4	42.1		63.1	63.9
+ d MTS1305	63.4	65.0		27.1	100.7	50.4		74.8	63.6
#+ Brawl CL Plus	71.3	52.3		25.5	90.5	50.1		85.7*	62.6
#+ WB4623CLP	72.7	55.0		14.4	115.9	47.7		67.1	62.1
Broadview	42.9	69.5*		58.1*	67.3	55.9		77.5	61.9
+ # d LCH 10-13	73.4	53.2		33.0	76.7	50.6		81.8*	61.5
d MTF1232	55.3	56.6		31.2	109.4	44.1		68.4	60.8
Rampart	53.6	60.1		33.0	101.0	45.1		59.5	58.7
Decade	46.6	59.5		47.7	69.3	55.3		72.9	58.6
Bearpaw	42.0	60.1		42.9	81.3	57.9		66.9	58.5
Jerry	42.1	58.9		52.3*	59.5	59.1*		74.6	57.8
d Genou	40.9	58.4		47.6	64.9	44.8		67.4	54.0
# WB4059CLP	56.2	48.3		21.6	61.6	48.9		65.4	50.3
Average	72.0	61.4		43.2	115.0	55.8		78.2	70.9
LSD (0.05)	11.0	5.7		13.7	12.6	10.8		16.6	14.0
C. V. (%)	8.7	5.3		15.8	6.2	10.9		12.2	17.3
P-value (Varieties)	<.0001	<.0001		<.0001	<.0001	<.0001		<.0001	<.0001

+ = new for 2015, # = paid entry

d = cultivars/lines dropped for 2016 test

\*\* = 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 2. 2015 Montana Intrastate Winter Wheat Test (Exp. 35): Multi-Location Test Weight (lb/bu)

Cultivar/Line		Bozeman	Have	Sidney	Williston	Kalispell	Moccasin	Huntley	Conrad	6 Loc
lattice efficiency		LAT	LAT		RCB	bulk	RCB		LAT	Avg.
		201%	233%						151%	
#	T158	58.9	61.8		60.8	64.0	61.5*		62.6*	61.6**
# d	LCS Mint	57.1	63.1**		63.0**	64.6	59.5		62.0*	61.6*
+ d	MTCL1329	58.6	62.1		60.9	63.5	60.8*		62.1*	61.3*
#+	SY Sunrise	56.3	61.8		62.1*	64.0	60.2*		62.6*	61.2*
+# d	LCH 10-13	57.4	62.2		61.6	62.1	60.7*		63.3**	61.2*
#+	Brawl CL Plus	56.4	61.9		62.0*	61.3	61.9**		62.9*	61.1*
#	SY Wolf	57.2	62.5		61.4	63.1	60.1*		61.8*	61.0*
	WB3768	58.8	60.6		61.5	63.1	60.5*		59.6	60.7*
#+	d Denali	56.0	62.6		61.3	61.4	60.7*		61.5*	60.6*
d	MT1286	58.0	61.1		60.4	62.4	60.4*		61.2	60.6*
#	WB4614	57.6	61.4		61.6	63.3	59.2		60.5	60.6*
#	Keldin	54.8	61.3		61.3	63.8	60.9*		60.3	60.4*
d	Ledger	56.1	61.7		61.3	63.6	58.3		61.3	60.4*
	MTCL1131	58.0	61.8		60.7	62.9	60.5*		58.5	60.4*
+	MT1332	57.3	61.1		60.7	62.4	60.3*		59.9	60.3*
+	MT1348	55.7	61.4		60.1	63.9	61.3*		59.6	60.3*
+ d	MTS1305	55.7	61.3		60.5	63.5	60.4*		60.6	60.3*
d	MT1117	57.3	60.9		61.1	63.1	60.3*		58.4	60.2
#+	WB4623CLP	58.9	60.7		57.7	63.8	60.0*		59.9	60.2
	Colter	57.4	60.9		61.4	63.0	59.7		58.2	60.1
	Judee	56.2	61.8		60.6	63.7	59.7		58.6	60.1
+	MT1354	57.9	61.4		60.4	63.6	59.2		57.9	60.1
+	MT1356	57.0	60.7		60.1	62.8	60.2*		59.6	60.1
d	MTCS1204	56.2	61.1		61.4	63.3	58.2		60.3	60.1
	Northern	57.3	60.6		60.9	62.7	59.9		59.3	60.1
	Yellowstone	56.9	60.9		60.7	62.4	59.6		60.0	60.1
	MT1138	56.4	61.2		60.8	62.8	59.9		58.7	60.0
#	WB4059CLP	55.6	61.8		60.1	61.0	60.0*		61.7*	60.0
	MT1257	57.0	60.5		60.4	62.3	59.5		59.9	59.9
d	MTS0826-63	61.1**	58.8		61.4	63.8	56.6		57.9	59.9
	MTS1224	58.3	60.7		61.1	62.9	58.1		57.5	59.8
	Rampart	57.2	59.7		61.0	63.1	58.3		59.7	59.8
	WB-Quake	56.7	60.7		61.1	63.6	57.8		58.6	59.8
d	Genou	56.6	60.7		61.6	61.3	58.2		59.8	59.7
+ d	MT1361	55.1	60.6		61.0	62.7	59.2		59.2	59.6
d	MTF1232	57.7	59.8		58.9	63.5	58.2		58.4	59.4
	MT1265	56.6	60.7		60.2	61.8	57.5		58.7	59.3
	SY Clearstone 2CL	54.9	60.7		61.2	62.7	59.1		57.2	59.3
	Warhorse	55.2	60.8		59.9	62.9	59.3		57.4	59.3
	Cowboy	54.1	61.8		61.2	60.1	58.6		59.5	59.2
#+	Byrd	53.6	62.1		61.2	60.3	58.5		58.7	59.1
#+	SY Monument	53.3	61.0		60.0	62.2	58.1		58.5	58.9
	Decade	52.5	61.3		61.5	59.0	58.9		59.8	58.8
	CDC Falcon	51.4	60.4		60.9	62.0	58.4		59.3	58.7
	Bearpaw	53.2	60.5		60.6	59.2	57.5		58.9	58.3
d	MT1078	54.5	60.1		60.2	61.9	57.5		55.3	58.3
	Freeman	52.5	60.3		58.4	61.8	56.3		59.6	58.2
	Jerry	53.9	60.0		59.6	57.7	58.4		58.5	58.0
	Broadview	51.9	60.0		60.6	57.1	58.6		58.8	57.8
	Average	56.2	61.1		60.8	62.4	59.3		59.7	59.9
	LSD (0.05)	1.4	0.5		1.3		1.9		1.9	1.4
	C. V. (%)	1.4	0.4		1.1		1.6		1.8	2.0
	P-value (Varieties)	<.0001	<.0001		<.0001		<.0001		<.0001	<.0001

+ = new for 2015, # = paid entry

d = cultivars/lines dropped for 2016 test

\*\* = 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 3. 2015 Montana Intrastate Winter Wheat Test (Exp. 35): Multi-Location Grain Protein (%)**

Cultivar/Line	Bozeman bulk	Havre LAT	Sidney	Williston bulk	Kalispell bulk	Moccasin bulk	Huntley	Conrad LAT	6 Loc Avg.
lattice efficiency		204%						136%	
d MTF1232	19.6	12.9		14.8	10.1	10.7		14.5*	13.8**
d MTS0826-63	18.3	13.6*		13.4	10.1	11.9		14.9**	13.7*
# WB4059CLP	18.6	13.4*		14.5	10.8	10.2		13.9*	13.6*
Rampart	19.5	13.3*		13.9	10.8	9.6		14.5*	13.6*
#+ WB4623CLP	17.8	13.5*		15.4	10.9	9.3		14.0*	13.5*
#+ Brawl CL Plus	17.4	13.5*		14.3	11.4	9.0		13.4	13.2*
Bearpaw	18.3	12.7		13.5	10.4	10.7		13.7	13.2*
d Genou	19.4	12.8		12.9	10.1	9.4		14.0*	13.1*
Decade	18.4	13.1		14.7	9.5	9.6		13.5	13.1*
Warhorse	18.4	12.7		12.0	11.0	9.8		14.0*	13.0*
+ # d LCH 10-13	17.1	13.9**		12.8	10.4	9.8		13.9*	13.0*
#+ SY Sunrise	16.2	12.9		14.9	9.8	10.1		13.3	12.9
Judee	14.3	12.8		15.7	9.9	10.4		14.4*	12.9
WB-Quake	16.5	12.8		13.5	9.6	10.1		14.0*	12.8
# Keldin	18.2	12.3		15.0	9.8	8.1		13.5	12.8
d MT1117	16.4	12.9		13.1	9.8	9.3		14.4*	12.7
Colter	17.2	13.0		12.8	9.9	9.8		13.5	12.7
Broadview	18.6	12.2		11.4	11.2	9.0		13.5	12.7
Northern	16.7	13.0		11.7	10.5	11.0		12.9	12.6
d MTCS1204	17.1	12.2		11.9	10.4	11.0		13.2	12.6
+ MT1354	16.1	12.6		13.3	9.9	9.9		13.7	12.6
Jerry	17.9	12.5		12.9	9.5	9.6		13.0	12.6
CDC Falcon	18.8	12.2		12.5	9.9	9.0		13.2	12.6
WB3768	16.4	12.8		12.1	9.6	10.0		13.8*	12.5
# SY Wolf	16.9	12.3		13.4	9.5	9.8		12.9	12.5
# WB4614	17.2	12.6		12.4	9.8	8.9		13.6	12.4
+ d MT1361	16.1	13.1		12.8	9.8	9.7		12.7	12.4
# T158	16.4	12.5		12.8	10.1	8.6		13.2	12.3
SY Clearstone 2CL	16.7	12.5		12.1	10.4	9.4		12.6	12.3
+ d MTS1305	17.3	12.2		12.4	9.5	9.0		13.1	12.3
MTS1224	15.5	13.3		12.8	9.6	9.5		13.3	12.3
+ MT1356	16.5	13.1		12.6	10.1	8.9		12.8	12.3
MT1265	16.0	12.7		12.3	9.3	10.3		13.4	12.3
d Ledger	16.9	12.3		12.6	9.9	9.7		12.6	12.3
# d LCS Mint	16.9	12.3		12.6	9.7	10.1		12.4	12.3
Freeman	16.2	12.6		14.0	9.4	8.9		12.6	12.3
d MT1286	16.9	12.3		13.0	9.0	9.2		12.9	12.2
+ d MTCL1329	16.1	11.9		12.7	10.0	9.4		12.7	12.1
+ MT1348	16.2	12.5		12.5	9.7	9.0		12.7	12.1
MT1257	16.3	12.4		11.5	10.0	9.6		12.7	12.1
MT1138	16.3	12.3		11.4	9.5	9.6		13.3	12.1
#+ SY Monument	16.7	11.2		13.2	9.1	9.0		12.7	12.0
d MT1078	17.1	11.7		12.2	9.2	8.9		13.1	12.0
MTCL1131	16.0	12.4		11.3	10.2	9.3		12.4	11.9
+ MT1332	16.1	12.7		12.1	9.0	8.8		12.5	11.9
Cowboy	16.8	11.2		12.0	10.1	8.8		12.3	11.9
#+ Byrd	15.9	11.4		13.3	9.1	9.1		12.4	11.9
Yellowstone	13.5	12.3		12.5	9.6	9.8		12.7	11.7
#+ d Denali	16.2	11.0		11.9	10.1	8.6		11.9	11.6
<b>Average</b>	<b>17.0</b>	<b>12.6</b>		<b>13.0</b>	<b>9.9</b>	<b>9.6</b>		<b>13.3</b>	<b>12.6</b>
<b>LSD (0.05)</b>		<b>0.5</b>						<b>1.1</b>	<b>0.8</b>
<b>C. V. (%)</b>		<b>2.5</b>						<b>4.9</b>	<b>5.8</b>
<b>P-value (Varieties)</b>		<b>&lt;.0001</b>						<b>&lt;.0001</b>	<b>&lt;.0001</b>

+ = new for 2015, # = paid entry

d = cultivars/lines dropped for 2016 test

\*\* = 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. 2015 Montana Intrastate Winter Wheat Test (Exp. 35): Multi-Location Heading Date (days from Jan. 1)

Cultivar/Line	Bozeman	Have	Sidney	Williston	Kalispell	Moccasin	Huntley	Conrad	6 Loc Avg.
	LAT	LAT		RCB	LAT	LAT	LAT	LAT	
lattice efficiency	109%	136%			144%	109%		125%	
# T158	155.2	145.0		156.0	147.5	155.1		150.3	151.5
Freeman	156.3	145.4		157.0	146.9	153.9		150.7	151.7
#+ Brawl CL Plus	156.6	145.4		156.5	147.9	154.9		150.5	152.0
+ # d LCH 10-13	157.1	145.2		156.5	150.7	157.1		151.3	153.0
# WB4059CLP	157.7	146.6		157.5	148.1	155.9		152.5	153.1
#+ Byrd	158.7	147.4		157.0	149.7	156.6		153.4	153.8
# d LCS Mint	158.1	146.9		158.0	149.5	157.2		153.0	153.8
#+ SY Sunrise	158.9	149.1		157.5	150.5	157.4		152.8	154.4
Cowboy	159.5	149.2		159.5	151.7	159.9		154.9	155.8
+ d MTCL1329	160.8	149.3		158.5	151.6	159.5		155.2	155.8
#+ SY Monument	160.4	150.2		157.5	150.8	159.9		155.7	155.8
# SY Wolf	161.0	149.6		159.5	150.7	160.4		154.7	156.0
#+ d Denali	160.1	150.1		159.0	151.8	160.3		155.2	156.1
Decade	161.9	151.3		157.5	152.2	159.8		155.8	156.4
+ MT1348	161.4	150.8		159.5	152.2	159.7		155.4	156.5
CDC Falcon	162.0	150.9		157.5	152.8	160.6		156.4	156.7
+ d MTS1305	161.4	151.0		160.5	152.0	159.6		155.5	156.7
Bearpaw	161.9	150.9		159.0	152.7	160.5		155.6	156.8
d Ledger	162.1	151.9		160.0	152.7	159.8		155.1	156.9
d Genou	162.7	150.0		159.0	153.8	159.9		156.8	157.0
Judee	162.0	151.2		160.5	153.0	160.0		155.2	157.0
# WB4614	161.9	152.3		159.5	152.9	160.1		156.4	157.2
Broadview	162.9	151.6		157.5	153.7	161.2		158.0	157.5
Jerry	163.3	152.0		156.5	154.2	161.1		157.8	157.5
MT1257	162.0	152.1		159.0	153.1	161.0		157.9	157.5
d MTCS1204	162.2	152.3		159.0	154.8	160.7		155.8	157.5
# Keldin	161.7	152.6		161.0	152.5	160.6		157.1	157.6
MT1138	163.0	151.7		159.5	154.3	161.3		157.1	157.8
Yellowstone	162.5	152.2		158.5	153.2	161.5		158.6	157.8
d MT1286	162.3	151.3		159.5	154.7	161.3		158.1	157.9
SY Clearstone 2CL	162.7	151.9		160.0	153.7	161.2		158.1	157.9
+ MT1332	162.4	152.2		160.0	153.8	160.9		158.6	158.0
Rampart	163.6	151.5		160.5	153.2	161.4		157.8	158.0
WB-Quake	162.9	153.2		160.0	153.1	161.0		158.4	158.1
d MT1078	162.6	153.0		160.5	153.4	161.2		158.2	158.2
+ MT1356	162.7	152.5		159.5	154.9	160.8		158.7	158.2
d MT1117	163.0	152.9		159.5	154.3	161.2		158.6	158.3
+ MT1354	163.3	152.8		160.0	153.9	161.1		158.5	158.3
#+ WB4623CLP	162.0	152.6		163.5	152.8	161.7		157.3	158.3
Warhorse	163.1	152.6		160.5	154.4	162.8		157.8	158.5
Colter	163.5	153.3		160.0	155.4	160.6		158.5	158.6
MT1265	163.6	152.7		160.5	155.2	161.6		158.2	158.6
MTS1224	163.6	153.9		159.0	154.5	161.2		159.4	158.6
MTCL1131	163.2	152.9		160.5	155.4	161.4		158.5	158.7
Northern	163.0	152.6		161.0	154.4	163.6		158.1	158.8
+ d MT1361	164.1	153.9		160.0	154.7	166.9		158.9	159.8
d MTS0826-63	165.6	153.9		160.5	155.3	164.4		159.9	159.9
d MTF1232	166.4	154.2		162.5	155.9	163.5		159.4	160.3
WB3768	165.9	155.0		161.5	156.7	166.3		159.8	160.9
<b>Average</b>	<b>161.7</b>	<b>151.1</b>		<b>159.2</b>	<b>152.8</b>	<b>160.4</b>		<b>156.4</b>	<b>156.9</b>
<b>LSD (0.05)</b>	<b>0.8</b>	<b>1.2</b>		<b>2.0</b>	<b>1.5</b>	<b>1.7</b>		<b>1.5</b>	<b>1.0</b>
<b>C. V. (%)</b>	<b>0.3</b>	<b>0.4</b>		<b>0.6</b>	<b>0.6</b>	<b>0.6</b>		<b>0.5</b>	<b>0.6</b>
<b>P-value (Varieties)</b>	<b>&lt;.0001</b>			<b>&lt;.0001</b>	<b>&lt;.0001</b>	<b>&lt;.0001</b>		<b>&lt;.0001</b>	<b>&lt;.0001</b>

+ = new for 2015, # = paid entry

d = cultivars/lines dropped for 2016 test

\*\* = 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. 2015 Montana Intrastate Winter Wheat Test (Exp. 35): Multi-Location Plant Height (in)**

Cultivar/Line		Bozeman	Have	Sidney	Williston	Kalispell	Moccasin	Huntley	Conrad	6 Loc
		LAT	LAT		RCB	LAT	LAT		LAT	Avg.
lattice efficiency		102%	101%			112%	113%		101%	
#	<b>WB4059CLP</b>	33.5	26.4		23.6	28.8	29.1		32.0	28.9
#+	<b>SY Sunrise</b>	34.9	26.9		22.4	31.8	27.5		30.7	29.0
	<b>CDC Falcon</b>	34.4	29.0		25.0	32.1	29.9		30.8	30.2
#+	<b>WB4623CLP</b>	37.3	26.3		23.2	35.4	31.1		30.7	30.7
#	<b>T158</b>	36.9	28.1		25.0	35.2	29.7		32.2	31.2
+ d	<b>MTS1305</b>	36.2	30.1		24.6	34.0	30.7		32.3	31.3
#	<b>SY Wolf</b>	37.0	29.4		27.0	32.7	29.6		32.0	31.3
	<b>MTS1224</b>	36.5	27.5		24.4	36.9	31.7		31.3	31.4
#	<b>WB4614</b>	37.1	30.2		26.0	33.2	32.0		32.3	31.8
#+	<b>Brawl CL Plus</b>	36.6	31.6		24.8	35.6	30.0		34.1	32.1
	<b>Decade</b>	35.4	29.3		27.6	36.1	31.0		32.9	32.1
	<b>Bearpaw</b>	36.4	28.0		26.4	37.4	34.2		31.9	32.4
+ d	<b>MT1361</b>	37.9	30.1		26.8	34.5	32.4		32.9	32.4
#+	<b>Byrd</b>	36.5	29.7		26.4	36.6	32.3		33.7	32.5
#+	<b>SY Monument</b>	36.3	30.9		24.4	37.0	32.6		33.8	32.5
	<b>Warhorse</b>	37.9	29.5		26.0	38.7	31.6		31.4	32.5
	<b>Freeman</b>	39.4	28.8		25.6	38.4	30.6		33.5	32.7
#	<b>Keldin</b>	37.0	30.4		26.8	35.6	33.1		33.1	32.7
+ d	<b>MTCL1329</b>	37.8	30.7		28.1	36.3	32.9		31.2	32.8
d	<b>Ledger</b>	37.6	30.4		27.0	36.0	32.9		34.0	33.0
	<b>WB-Quake</b>	37.9	29.9		27.2	37.7	32.8		32.2	33.0
	<b>Judee</b>	37.7	30.6		28.3	37.8	30.6		33.7	33.1
	<b>Cowboy</b>	37.2	32.8		28.5	35.2	33.4		32.5	33.3
	<b>Broadview</b>	38.3	31.9		27.2	36.4	33.5		33.4	33.5
d	<b>MT1078</b>	36.7	31.8		28.9	37.8	32.2		33.4	33.5
+ d	<b>MT1348</b>	40.9	30.2		26.2	36.1	32.8		34.7	33.5
# d	<b>LCS Mint</b>	38.9	30.7		28.7	38.2	33.5		34.4	34.1
d	<b>MTCS1204</b>	38.2	31.6		28.9	38.6	34.0		33.3	34.1
	<b>Northern</b>	38.5	31.5		27.0	38.9	34.1		35.0	34.2
#+	d <b>Denali</b>	38.1	31.4		28.5	38.9	33.1		36.0	34.3
+ #	d <b>LCH 10-13</b>	39.4	30.6		28.7	39.9	32.4		35.8	34.5
	<b>MT1257</b>	39.4	32.1		28.9	39.9	34.8		34.7	35.0
d	<b>MT1286</b>	40.0	31.3		29.5	39.2	34.6		35.8	35.1
	<b>Yellowstone</b>	39.1	33.4		28.3	40.7	34.7		34.4	35.1
	<b>Colter</b>	39.0	32.4		29.1	41.6	34.8		34.1	35.2
+ d	<b>MT1356</b>	40.8	32.7		28.1	41.2	33.5		34.9	35.2
d	<b>MT1117</b>	37.7	34.4		29.5	40.3	35.5		35.0	35.4
+ d	<b>MT1354</b>	39.9	32.8		30.3	40.1	34.5		35.0	35.4
	<b>MTCL1131</b>	40.4	31.2		28.5	42.1	34.9		35.1	35.4
	<b>SY Clearstone 2CL</b>	39.7	34.2		29.7	40.2	34.6		34.2	35.4
	<b>MT1138</b>	39.7	32.6		29.3	40.6	36.3		34.8	35.6
	<b>MT1265</b>	40.1	33.7		28.5	41.5	33.9		36.3	35.7
+ d	<b>MT1332</b>	40.6	33.2		30.1	39.4	34.5		36.6	35.7
d	<b>MTS0826-63</b>	41.4	31.1		29.5	41.5	36.0		34.7	35.7
	<b>Rampart</b>	40.4	31.7		32.1	41.8	37.3		36.2	36.6
d	<b>Genou</b>	40.1	33.2		29.7	43.1	36.1		38.6	36.8
	<b>WB3768</b>	40.5	33.2		32.9	43.5	37.9		35.7	37.3
	<b>Jerry</b>	40.3	34.2		29.1	44.8	37.6		38.4	37.4
d	<b>MTF1232</b>	45.3	37.5		38.4	50.6	46.5		43.8	43.7
<b>Average</b>		<b>38.3</b>	<b>31.0</b>		<b>27.8</b>	<b>38.2</b>	<b>33.4</b>		<b>34.1</b>	<b>33.8</b>
<b>LSD (0.05)</b>		<b>2.8</b>	<b>2.9</b>		<b>1.7</b>	<b>3.1</b>	<b>2.7</b>		<b>2.2</b>	<b>1.4</b>
<b>C. V. (%)</b>		<b>4.4</b>	<b>5.6</b>		<b>3.1</b>	<b>4.9</b>	<b>4.6</b>		<b>4.0</b>	<b>3.8</b>
<b>P-value (Varieties)</b>		<b>&lt;.0001</b>	<b>&lt;.0001</b>		<b>&lt;.0001</b>	<b>&lt;.0001</b>	<b>&lt;.0001</b>		<b>&lt;.0001</b>	<b>&lt;.0001</b>

+ = new for 2015, # = paid entry

d = cultivars/lines dropped for 2016 test

\*\* = 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 6. 2015 Montana Intrastate Winter Wheat Test (Exp. 35): Multi-Location Stem Solidness (5-25)**

Cultivar/Line		Bozeman	Havre	Moccasin	Conrad	4 Loc Avg.
<b>+ MTS1305</b>	MTS0525//97X253E54/MT03108	<b>21.7**</b>	<b>24.4**</b>	<b>22.5**</b>	<b>20.7*</b>	<b>22.3**</b>
<b>Warhorse</b>	Montana, 2013	<b>20.8*</b>	<b>23.4*</b>	<b>21.5*</b>	<b>22.5**</b>	<b>22.0*</b>
<b>MTS0826-63</b>	MT9524/G15048//Rampart	17.1	<b>22.8*</b>	<b>20.8*</b>	<b>22.4*</b>	20.8
<b>Bearpaw</b>	Montana, 2011	<b>18.3*</b>	21.5	<b>20.9*</b>	<b>21.3*</b>	20.5
<b>Rampart</b>	Montana, 1996	14.7	<b>22.7*</b>	20.5	<b>20.8*</b>	19.7
<b>Judee</b>	Montana, 2011	16.9	20.3	19.4	<b>20.1*</b>	19.2
<b>WB-Quake</b>	WestBred, 2011	17.1	19.4	19.9	<b>19.9*</b>	19.1
<b>MTCS1204</b>	MTCL0510/4/Paul/3/98X96C16c/CI	14.0	19.0	17.3	18.6	17.2
<b>MTS1224</b>	Yellowstone//MTS0112/MTS0125	14.6	20.8	16.2	17.1	17.2
<b>Genou</b>	Montana, 2004	10.2	21.6	15.3	17.2	16.1
<b>Ledger</b>	WestBred, 2004	7.9	9.9	7.3	8.5	8.4
<b>CDC Falcon</b>	Sask/WestBred, 1999	6.1	6.2	5.9	7.1	6.3
<b>Average</b>		<b>15.8</b>	<b>20.6</b>	<b>17.3</b>	<b>19.0</b>	<b>18.4</b>
<b>LSD (0.05)</b>		<b>3.6</b>	<b>2.8</b>	<b>2.1</b>	<b>2.9</b>	<b>1.4</b>
<b>C. V. (%)</b>		<b>13.5</b>	<b>8.0</b>	<b>7.1</b>	<b>8.8</b>	<b>9.2</b>
<b>P-value (Varieties)</b>		<b>&lt;.0001</b>	<b>&lt;.0001</b>	<b>&lt;.0001</b>	<b>&lt;.0001</b>	<b>&lt;.0001</b>

**Locations were significant ( $P = <.0001$ ), there was a significant Entry x Location Interaction ( $P = .0038$ )**

+ = new for 2015, # = paid entry

\*\* = 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 7. 2015 Montana Intrastate Winter Wheat Test (Exp. 35): Multi-Location Stripe Rust Evaluation, including data from Pullman and Mt. Vernon, WA**

Cultivar/Line	Stripe Rust												
	Montana (%)						Pullman, WA		MT. Vernon, WA				
	Kalispell			Bozeman			FE	Milk		Stem elong.		Heading/flowering	
	7-Jun	25-Jun	29-Jul	8-Jun	16-Jun	29-Jun	IT <sup>1/</sup>	%	IT <sup>1/</sup>	%	IT <sup>1/</sup>	%	
#+ Bearpaw	43	70	74	14	50	40	8	80	8	30	8	65	
#+ Brawl CL Plus	60	50	75	26	43	50	3	10	-	-	-	-	
Broadview	75	90	85	9	28	50	8	10	-	-	-	-	
#+ Byrd	45	78	87	8	44	70	5	20	8	60	8	50	
CDC Falcon	75	83	60	3	11	50	8	30	8	80	8	95	
Colter	5	4	20*	4	3	0	5	1	3	10	2	20	
Cowboy	95	93	89	20	59	70	2	5	-	-	-	-	
Decade	50	69	92	5	39	30	8	20	8	50	8	75	
#+ d Denali	65	89	81	26	56	80	5	10	8	40	5	60	
Freeman	10	10	50	5	1	0	8	2	5	10	5	30	
d Genou	45	83	90	4	21	60	8	30	8	50	8	90	
Jerry	70	92	90	7	57	40	8	50	8	50	8	65	
Judee	1	2	10*	9	3	0	3	5	6	20	2	20	
# Keldin	5	11	35	0	5	5	8	5	2	5	5	35	
+ d LCH 10-13	70	92	92	9	39	30	5	5	8	50	8	100	
# d LCS Mint	4	16	23	0	4	0	-	-	-	-	-	-	
d Ledger	10	15	66	3	13	25	8	20	5	20	5	25	
d MT1078	10	11	31	6	9	5	2	5	3	10	2	20	
d MT1117	0**	4	19*	0	4	0	2	2	-	-	-	-	
MT1138	3	5	24	2	7	3	2	1	3	5	2	5	
MT1257	5	6	23*	3	5	0	2	1	-	-	-	-	
MT1265	3	5	21*	0	0	0	2	2	-	-	-	-	
d MT1286	18	38	80	1	20	5	5	20	-	-	-	-	
+ MT1332	3	3	12*	3	2	3	2	1	3	10	2	20	
+ MT1348	0**	4	15*	4	5	3	2	2	8	50	3	10	
+ MT1354	3	5	16*	2	6	15	2	2	8	40	2	5	
+ MT1356	10	8	27	2	4	5	3	5	-	-	-	-	
+ d MT1361	3	5	17*	3	5	10	3	10	8	40	2	20	
MTCL1131	8	5	20*	3	8	5	3	2	-	-	-	-	
+ d MTCL1329	5	17	32	8	10	20	2	10	3	5	5	20	
d MTCS1204	20	31	48	18	32	20	3	5	8	50	2	10	
d MTF1232	15	22	53	0	29	25	5	25	-	-	-	-	
d MTS0826-63	0**	6	15*	3	12	0	2	2	5	20	2	10	
MTS1224	3	2	7*	4	5	0	2	2	-	-	-	-	
+ d MTS1305	5	12	33	2	6	5	2	5	8	50	5	15	
Northern	5	1**	5**	4	3	0	3	2	2	5	2	20	
Rampart	15	12	62	2	8	15	5	10	5	30	5	30	
SY Clearstone 2C	1	5	17*	2	8	5	2	1	2	10	2	20	
#+ SY Monument	1	3	21*	1	0	0	2	1	-	-	-	-	
#+ SY Sunrise	2	12	32	3	0	10	2	1	2	5	3	5	
# SY Wolf	5	6	22*	1	3	0	8	10	-	-	-	-	
# T158	3	2	20*	5	0	0	-	-	-	-	-	-	
Warhorse	5	7	6*	1	3	0	2	2	6	20	2	20	
WB3768	3	7	17*	3	1	5	8	5	3	10	5	15	
# WB4059CLP	80	85	98	8	35	30	8	5	8	60	8	100	
# WB4614	28	23	44	6	9	10	5	10	8	40	5	30	
#+ WB4623CLP	0**	4	12*	3	6	0	5	10	8	40	5	45	
WB-Quake	5	9	9*	15	14	0	3	5	5	20	2	20	
Yellowstone	3	8	23	2	6	0	2	5	2	5	5	50	
<b>Average</b>	<b>20.2</b>	<b>26.9</b>	<b>40.8</b>	<b>5.5</b>	<b>15.0</b>	<b>16.3</b>							
<b>LSD (0.05)</b>	<b>17.9</b>	<b>9.1</b>	<b>17.8</b>	<b>10.3</b>	<b>13.9</b>								

<sup>1/</sup> Infection Type (IT) was recorded based on the 0-9 scale with ITs 8 and 9 combined as 8 (the most susceptible reaction) in field data. Generally IT 0-3 are considered resistant, 4-6 intermediate, and 7-9 susceptible. Heterogenous reactions of an entry were indicated by two or more ITs separated by "," for most plants with the first IT and few plants with the second IT or connected with "-" for entries containing plants with continuous ITs.

\*\* = 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)