

Project Title: 2011 Intra-State Winter Wheat Variety Performance

Project Leader: P.L. Bruckner Plant Science Bozeman, MT

Project Personnel:

J.E. Berg	RA- Plant Science	Bozeman, MT
P.F. Lamb	NARC	Havre, MT
J.L. Eckhoff	EARC	Sidney, MT
W.E. Grey	Plant Science	Bozeman, MT
J. Johnston	Plant Science	Bozeman, MT
J. Miller	WTARC	Conrad, MT
K.D. Kephart	SARC	Huntley, MT
N.R. Riveland	WREC	Williston, ND
R.N. Stougaard	NWARC	Kalispell, MT
D.M. Wichman	CARC	Moccasin, MT

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 2011 Intrastate Winter Wheat Evaluation nursery was grown at Bozeman, Havre, Huntley, Conrad, Kalispell, Moccasin, and Sidney, Montana and Williston, North Dakota. The Havre location was not harvested due to variable stand not caused by winter kill. Stripe rust was wide spread in Montana.

The overall mean yield, across the seven harvested locations, was 66.8 bushels per acre with Conrad having the high trial mean at 93.7 bu/a. Yellowstone had overall high mean yield of cultivars at 81.7 bu/a (Table 1). Test weights were near the standard with the overall mean of 60.2 lbs/bu. Promontory, possibly due more disease resistance, had the top overall mean test weight at 62.3 lbs/bu and Wahoo had the lowest density at 56.4 lbs/bu (Table 2). Overall mean heading date, 175.5, was five days later than 2010 mean. Art was the earliest and Pryor was the latest to head (Table 3). Due to shorter plants at Bozeman and Kalispell, the mean plant height, 35.3", was 1.6" less than the 2010 mean plant height. Carter at 30.3" was the shortest and Peregrine, 40.8", was the tallest (Table 4). The average grain protein content a was slightly below the standard at 11.6% with Bynum having 12.5% protein for the high average (Table 5). Winter survival ratings are not presented. Solid stem cultivars, Rampart, Judee, Genou and Bynum along with hollow stem Curlew, experienced the worst lodging at Huntley and Kalispell. Tall type, Norris, was among the four with the least lodging (Table 6). Fourteen entries were evaluated for stem solidness. CDC Falcon and Ledger had the least stem solidness, scores 6.1 and 8.6 respectively, while cultivars Bearpaw and Rampart both scored 21.0. Development lines MTS0808 and MTS0826 scored 21.5 and 21.2, respectively (Table 7). The wet 2011 spring provided a high incidence of disease. In some instances the plurality of diseases were difficult to rate. Stripe rust, stem rust, tan spot, and WSMV infection rates at five locations are presented in Table 8.

Summary:

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

Table 1. 2011 Intrastate Winter Wheat Test (Exp. 35): Multi-Location Yield (bu/a)										Stripe Rust	
Cultivar/Line	no harv.									no BZ, KS	
	Bozeman LAT	Havre poor stands	Sidney LAT	Williston LAT	Kalispell LAT	Moccasin LAT	Huntley LAT	Conrad LAT	7 Loc Avg.	BZ, KS Avg.	5 Loc Avg.
lattice efficiency	100%		124%	132%	106%	102%	117%	134%			
+ MT08172	96.1*		66.5	63.1	121.8*	53.4*	78.1	99.7*	82.7**	109.0*	72.2*
Yellowstone	91.4*		67.5	65.9*	109.1	51.9*	80.3	100.9*	81.0*	100.3*	73.3*
+ MTW08168	86.2		64.2	56.2	118.2*	50.7*	83.2	104.0*	80.4*	102.2*	71.7*
+ MT0978	87.7*		68.2	66.7*	101.7	51.7*	82.8	99.4*	79.7*	94.7*	73.8*
Promontory	100.4**		50.9	55.3	125.8**	44.6	76.7	99.5*	79.0*	113.1**	65.4
+ MT0990	88.4*		65.7	65.3*	108.6	53.9*	73.5	97.8	79.0*	98.5*	71.2*
+ MT08146	81.5		63.5	65.4*	109.9	49.1*	75.9	103.9*	78.5*	95.7*	71.6*
MTS0808	88.7*		59.5	55.6	114.1*	47.2	79.8	94.2	77.0*	101.4*	67.3
+ MT08189	84.1		60.4	53.2	105.7	50.0*	74.9	100.8*	75.6*	94.9*	67.9
Curlew	87.0*		54.5	61.6	113.0*	41.2	76.8	94.7	75.5*	100.0*	65.8
+ MTCL1067	86.8*		56.4	64.7*	92.2	52.3*	75.4	95.5	74.8*	89.5*	68.9
Judee	89.1*		44.4	65.0*	105.2	43.6	73.8	97.4	74.1*	97.2*	64.8
MT0871	63.1		57.4	59.8	92.2	48.1	87.6*	105.4*	73.4*	77.7	71.7*
# WB-Quake	83.1		52.7	57.0	98.3	49.9*	80.1	87.1	72.6*	90.7*	65.4
++ SY Wolf	65.2		58.9	59.3	80.5	46.3	80.3	109.7**	71.5*	72.9	70.9*
Robidoux	83.7		48.8	65.1*	69.1	55.8**	75.4	101.6*	71.4*	76.4	69.3
# Radiant	83.3		53.2	62.8	98.3	41.0	71.4	87.6	71.1*	90.8*	63.2
MTS0819	73.2		49.6	60.2	77.7	48.3	84.1*	102.2*	70.8*	75.5	68.9
+ MTCL1068	63.9		56.2	72.1*	73.2	51.7*	82.2	95.6	70.7*	68.6	71.6*
Overland	65.0		77.9**	64.5*	34.4	53.6*	92.3**	99.0*	69.5*	49.7	77.5**
Peregrine	86.4*		56.1	59.8	79.5	41.5	72.8	85.2	68.8*	83.0*	63.1
# Art	72.2		51.7	56.3	61.9	46.4	89.1*	102.8*	68.6*	67.1	69.3
+ McGill	53.7		56.5	63.3*	55.4	49.5*	88.2*	101.5*	66.8	54.6	71.7*
Settler CL	69.4		53.0	70.0*	30.8	53.4*	83.8*	101.6*	66.0	50.1	72.4*
Accipiter	60.3		58.3	65.7*	51.9	51.2*	74.3	95.2	65.3	56.1	68.9
MTS0826	72.0		52.3	62.5	69.6	36.5	78.7	82.6	64.9	70.8	62.5
Hyalite (CL, HW)	66.2		58.7	60.4	66.7	41.7	74.9	86.0	64.9	66.5	64.3
Jagalene	68.5		57.6	54.5	68.7	40.0	64.8	96.9	64.4	68.6	62.8
# Boomer	52.4		61.5	67.7*	56.4	45.3	72.2	89.0	63.5	54.4	67.1
Pryor	44.2		57.5	67.1*	56.0	45.5	72.0	102.1*	63.5	50.1	68.8
Rampart	74.7		47.4	65.7*	67.5	37.5	73.7	76.3	63.3	71.1	60.1
# AP 503 CL2	60.7		41.7	58.4	99.0	36.5	59.9	82.4	62.7	79.9	55.8
MT0866	61.7		65.3	57.1	29.6	48.3	75.4	100.2*	62.5	45.7	69.3
CDC Falcon	55.1		56.9	66.6*	52.4	46.3	67.6	89.2	62.0	53.8	65.3
Bearpaw	63.2		54.6	65.4*	36.7	43.5	74.9	90.5	61.3	50.0	65.8
+ MT0954	50.7		67.8	67.5*	13.8	46.5	76.9	101.3*	60.6	32.3	72.0*
# WB-Matlock	55.4		72.8*	55.2	31.7	42.4	73.6	90.8	60.3	43.6	67.0
Norris (CL)	59.2		59.6	55.2	42.0	41.6	74.4	89.1	60.2	50.6	64.0
Broadview	56.1		55.5	66.6*	25.4	46.9	71.6	96.8	59.8	40.8	67.5
Bynum (CL)	68.4		35.6	51.8	78.2	34.8	73.0	72.8	59.2	73.3	53.6
Decade	59.6		65.0	69.2*	16.4	42.9	70.0	91.6	59.2	38.0	67.7
Jerry	66.8		68.2	54.6	28.2	47.4	62.6	85.0	59.0	47.5	63.6
Ledger	47.5		44.2	56.2	47.3	43.3	72.2	89.4	57.2	47.4	61.1
MTS0832	34.7		56.4	73.1**	13.2	47.2	76.7	89.4	55.8	24.0	68.6
Wahoo	36.3		56.4	62.3	13.2	47.9	77.0	93.3	55.2	24.8	67.4
++ BZ9W07-1516	45.5		51.1	60.4	21.7	43.7	69.5	79.9	53.1	33.6	60.9
Carter	36.9		52.7	59.2	18.9	44.0	68.6	91.2	53.1	27.9	63.1
Genou	47.9		43.5	53.4	26.1	39.9	74.0	84.1	52.7	37.0	59.0
+ MTCL1003	41.8		48.4	51.7	41.5	31.4	62.2	78.8	50.8	41.7	54.5
Average	67.7		56.8	61.5	66.3	45.9	75.7	93.7	66.8	67.0	66.7
LSD (0.05)	15.1		9.5	10.6	13.6	6.8	8.7	10.9	14.9	31.1	6.7
C. V. (%)	13.4		9.6	9.9	12.0	8.9	6.7	6.6	21.3	23.1	8.1
P-value (Varietal)	<.0001		<.0001	0.0012	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

+ = new for 2011, # = 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 2. 2011 Intrastate Winter Wheat Test (Exp. 35): Multi-Location Test Weight (lb/bu)										Stripe Rust	
Cultivar/Line	no harv.								no BZ, KS		
	Bozeman LAT	Have poor stands	Sidney bulk	Williston RCB	Kalispell bulk	Moccasin RCB	Huntley LAT	Conrad RCB	7 Loc Avg.	BZ, KS Avg.	5 Loc Avg.
lattice efficiency	105%								104%		
Promontory	62.4**		61.5	61.2	62.7	64.8**	62.0	63.7*	62.6**	62.6**	62.6**
# AP 503 CL2	58.6		59.5	62.5**	62.1	64.4*	62.3*	63.7*	61.9*	60.4	62.5*
Bynum (CL)	62.1*		59.5	61.1	62.5	62.9	62.1	62.6	61.8*	62.3	61.6
Peregrine	61.5*		59.5	60.0	62.7	62.5	62.4*	62.5	61.6*	62.1	61.4
Rampart	60.9		59.5	60.3	62.4	62.6	61.8	63.1	61.5*	61.7	61.5
+# SY Wolf	59.6		60.5	61.5*	60.4	62.8	61.8	63.5*	61.4*	60.0	62.0*
MT0866	61.3		61.0	60.2	54.9	64.5*	63.5**	63.8*	61.3*	58.1	62.6*
Jagalene	60.3		59.5	61.6*	59.9	62.7	60.7	64.5**	61.3*	60.1	61.8*
Judee	60.0		58.5	60.7	61.0	63.7	61.2	64.1*	61.3*	60.5	61.6
MTS0826	61.2		59.5	60.8	58.9	63.2	62.2	62.2	61.1*	60.1	61.6
# WB-Matlock	59.9		59.5	61.7*	57.6	63.3	61.7	63.4*	61.0*	58.8	61.9*
Accipiter	58.9		59.0	60.8	61.3	62.6	61.7	62.8	61.0*	60.1	61.4
Curlew	59.0		58.5	60.0	61.3	63.9	60.8	62.2	60.8	60.2	61.1
# WB-Quake	60.1		58.0	60.2	60.7	63.1	60.7	62.9	60.8	60.4	61.0
MTS0808	60.1		58.5	59.7	61.3	62.5	60.7	62.2	60.7	60.7	60.7
Robidoux	60.5		58.5	61.1	56.6	63.2	60.4	63.8*	60.6	58.6	61.4
# Art	59.3		58.5	62.2*	53.8	63.8	62.6*	63.0	60.5	56.6	62.0*
Carter	57.3		59.5	61.8*	57.2	62.7	61.3	63.4*	60.5	57.3	61.7
Hyalite (CL, HWW)	59.2		59.0	61.0	56.8	63.0	62.6*	62.0	60.5	58.0	61.5
Overland	59.7		59.5	61.4*	53.1	63.0	62.4*	63.5*	60.4	56.4	62.0*
Genou	59.5		57.5	60.8	56.8	62.4	62.1	63.4*	60.4	58.2	61.2
Ledger	58.9		59.0	61.0	57.2	62.5	61.0	62.4	60.3	58.1	61.2
# Radiant	60.0		59.0	60.0	56.7	63.2	62.0	61.1	60.3	58.4	61.1
+ MTW08168	59.4		60.0	60.1	57.8	62.2	61.9	61.0	60.3	58.6	61.0
+ MT0978	59.9		59.0	59.8	57.2	62.6	61.2	61.7	60.2	58.6	60.9
Pryor	56.5		59.0	60.2	61.0	62.2	59.0	63.5*	60.2	58.8	60.8
+ MT08189	59.7		58.0	59.1	59.4	62.6	61.1	61.6	60.2	59.6	60.5
Norris (CL)	60.3		59.5	60.2	53.1	63.1	62.0	62.3	60.1	56.7	61.4
+ MT0990	59.3		57.7	59.3	59.7	62.0	60.6	61.8	60.1	59.5	60.3
CDC Falcon	57.0		57.5	60.5	59.8	62.8	60.7	61.9	60.0	58.4	60.7
Yellowstone	58.7		58.5	59.4	60.1	61.8	60.5	60.7	60.0	59.4	60.2
MTS0819	58.2		58.5	60.8	54.9	63.0	61.1	62.7	59.9	56.6	61.2
Broadview	56.9		58.5	60.8	58.4	62.8	59.9	62.1	59.9	57.7	60.8
Settler CL	59.4		59.5	61.3	52.6	62.4	61.1	62.5	59.8	56.0	61.4
+ MTCL1067	58.8		58.0	60.1	58.4	62.0	60.3	60.9	59.8	58.6	60.3
+ MT08172	59.6		58.0	58.8	59.8	62.6	60.7	59.2	59.8	59.7	59.9
+ MT0954	58.0		60.5	60.1	52.3	63.7	60.6	62.1	59.6	55.2	61.4
MT0871	58.4		57.5	59.0	57.9	61.9	60.8	61.0	59.5	58.2	60.0
Bearpaw	59.7		58.5	60.6	50.9	62.8	61.2	61.5	59.3	55.3	60.9
+ McGill	57.4		58.0	60.6	52.2	62.8	60.9	62.0	59.1	54.8	60.9
Jerry	58.5		58.5	59.4	52.7	62.1	61.2	61.6	59.1	55.6	60.6
MTS0832	56.2		59.0	58.7	55.0	62.0	60.7	61.0	58.9	55.6	60.3
+ MTCL1068	57.1		57.5	58.6	56.8	61.5	59.6	61.1	58.9	57.0	59.7
Decade	57.6		60.0	61.1	47.3	63.4	60.4	61.6	58.8	52.5	61.3
+ MT08146	57.2		57.0	57.6	57.6	61.4	59.8	60.8	58.8	57.4	59.3
# Boomer	55.9		57.5	58.8	56.2	61.2	58.4	61.5	58.5	56.1	59.5
+ MTCL1003	58.2		58.5	58.2	53.8	60.1	60.6	60.2	58.5	56.0	59.5
+# BZ9WM07-1516	57.5		58.5	60.1	49.2	62.3	59.0	62.2	58.4	53.4	60.4
Wahoo	55.5		56.5	59.0	46.2	60.7	56.2	60.8	56.4	50.9	58.6
Average	59.0		58.8	60.3	57.1	62.7	61.0	62.2	60.2	58.1	61.0
LSD (0.05)	1.1			1.2		0.6	1.2	1.3	1.7	5.1	0.9
C. V. (%)	1.1			1.0		0.5	1.2	1.3	2.7	4.4	1.2
P-value (Varieties)	<.0001			<.0001		<.0001		<.0001	<.0001	0.0171	<.0001

+ = new for 2011, # = 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 3. 2011 Intrastate Winter Wheat Test (Exp. 35): Multi-Location Heading Date (days after Jan 1)

Cultivar/Line	Bozeman LAT	Have LAT	Sidney LAT	Williston LAT	Kalispell LAT	Moccasin LAT	Huntley RCB	Conrad LAT	x Loc Avg.
lattice efficiency	105%	152%	157%	161%	115%	109%		117%	
# Art	178.2	169.6	169.2	163.9	169.7	175.9	166.0	174.6	170.9
+# BZ9WM07-1516	178.9	172.1	171.0	165.1	169.3	177.3	165.0	173.6	171.5
+ McGill	180.5	172.6	170.4	166.8	171.1	178.6	167.0	174.7	172.7
Robidoux	179.7	173.6	170.6	166.5	171.2	178.4	167.3	174.3	172.7
Settler CL	179.0	169.3	170.5	169.2	173.4	179.7	167.3	174.5	172.9
Norris (CL)	181.3	171.4	170.5	166.8	173.6	179.3	167.7	175.6	173.3
Jagalene	180.8	172.5	171.3	167.1	173.0	180.1	167.7	176.1	173.6
# AP 503 CL2	181.1	174.3	171.7	167.6	172.7	178.8	168.3	175.1	173.7
Decade	180.7	171.3	172.0	167.6	175.2	179.9	168.3	174.9	173.7
Hyalite (CL, HWW)	181.1	173.0	172.0	167.8	173.1	179.4	168.3	174.8	173.7
Overland	180.7	172.5	169.9	170.1	174.6	178.9	168.0	176.5	173.9
Wahoo	180.3	174.3	170.0	171.4	174.4	178.0	167.3	176.3	174.0
Bynum (CL)	182.0	174.5	171.9	167.5	173.0	178.0	168.7	176.9	174.1
+# SY Wolf	181.9	173.7	171.6	168.1	173.4	179.9	168.3	176.6	174.2
CDC Falcon	181.3	173.5	173.3	165.6	173.0	180.9	169.7	178.5	174.5
Ledger	181.4	174.2	172.5	167.7	173.9	180.0	170.0	176.2	174.5
Judee	181.3	175.0	173.3	168.6	174.8	180.6	170.0	175.4	174.9
Bearpaw	181.6	175.3	172.2	169.6	173.8	180.3	171.3	176.7	175.1
Carter	181.3	173.8	173.0	168.8	178.4	179.6	168.3	177.5	175.1
Promontory	181.4	175.2	173.5	169.2	172.8	181.0	169.0	179.0	175.1
Rampart	182.1	176.3	173.1	166.4	175.5	180.1	170.7	178.4	175.3
Broadview	181.4	173.3	171.7	169.1	179.2	180.0	171.0	178.1	175.5
+ MTCL1068	182.4	175.8	173.9	169.0	174.9	180.3	170.0	178.8	175.6
+ MTCL1067	182.3	175.4	173.5	169.3	176.5	181.0	169.3	178.5	175.7
MTS0808	182.3	174.7	172.7	170.3	175.8	181.2	171.7	178.0	175.8
Curlew	183.0	176.4	174.0	167.6	176.8	181.7	170.0	177.9	175.9
Jerry	182.7	175.4	172.9	166.0	179.4	181.1	171.3	178.7	175.9
Genou	182.7	175.5	173.3	168.5	178.2	180.1	171.0	178.5	176.0
MT0866	182.9	173.5	173.1	169.2	178.4	180.3	171.3	179.0	176.0
Peregrine	183.7	175.1	173.1	169.3	178.4	180.7	170.0	178.8	176.1
# Boomer	181.8	174.9	173.4	170.6	178.3	180.6	171.0	179.1	176.2
+ MT08146	182.8	174.8	173.7	170.2	176.8	181.4	172.3	179.4	176.4
# WB-Matlock	182.3	174.1	173.6	169.6	179.0	181.1	172.0	179.3	176.4
+ MT0954	182.4	174.4	174.6	169.7	180.3	181.6	171.0	178.9	176.6
MTS0819	182.2	175.0	174.0	171.4	178.3	181.2	171.7	178.6	176.6
MT0871	183.6	176.1	173.4	170.3	177.2	181.6	172.0	179.0	176.7
+ MTCL1003	183.0	176.9	173.2	170.7	177.8	182.8	171.3	178.2	176.7
# Radiant	183.3	175.6	173.4	168.4	180.7	182.1	172.7	178.8	176.9
Yellowstone	183.5	175.8	174.8	170.5	177.2	181.4	171.7	180.0	176.9
# WB-Quake	182.8	175.9	173.8	170.1	179.0	181.9	172.7	179.8	177.0
+ MT08189	183.7	173.9	174.3	171.1	179.0	181.9	172.0	180.7	177.1
+ MT08172	183.1	176.7	175.1	170.9	177.1	181.8	172.0	180.7	177.2
+ MT0978	183.4	176.5	174.4	170.5	177.8	182.2	173.0	179.7	177.2
+ MT0990	183.6	174.9	174.6	170.7	178.8	181.8	172.0	180.9	177.2
Accipiter	183.2	175.1	174.1	170.6	180.3	182.9	173.0	179.5	177.3
Pryor	184.0	178.5	174.8	170.5	180.5	181.3	172.0	179.7	177.7
MTS0832	184.6	177.4	174.2	171.8	179.9	181.9	173.3	180.3	177.9
+ MTW08168	186.2	177.8	175.8	169.1	179.8	183.3	174.3	182.7	178.6
MTS0826	185.4	177.1	175.3	171.5	182.3	183.7	175.0	180.9	178.9
Average	182.1	174.6	172.9	168.9	176.3	180.6	170.3	177.9	175.5
LSD (0.05)	1.1	2.3	1.4	1.6	1.9	1.2	1.3	1.6	1.1
C. V. (%)	0.4	0.8	0.5	0.5	0.6	0.4	0.5	0.5	0.6
P-value (Varieties)	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

+ = new for 2011, # = 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 4. 2011 Intrastate Winter Wheat Test (Exp. 35): Multi-Location Plant Height (in)

Cultivar/Line	Bozeman LAT	Have LAT	Sidney LAT	Williston LAT	Kalispell LAT	Moccasin LAT	Huntley RCB	Conrad LAT	8 Loc Avg.
lattice efficiency	113%	122%	206%	121%	102%	114%		105%	
+# BZ9WM07-1516	30.0	30.0	29.4	26.7	32.4	30.0	34.5	29.1	30.3
Carter	30.2	30.1	29.6	27.0	28.3	30.8	37.3	33.6	30.9
Pryor	29.3	30.9	30.0	28.0	31.0	29.5	36.2	34.1	31.1
# AP 503 CL2	33.6	32.8	29.6	25.7	33.1	29.9	37.9	32.3	31.9
CDC Falcon	32.1	36.7	31.6	29.5	33.2	31.5	34.6	33.6	32.9
Ledger	34.3	32.4	30.1	27.7	34.1	31.6	39.0	34.2	32.9
# Art	33.7	33.6	30.5	27.6	35.8	31.9	37.7	34.4	33.2
Bearpaw	33.9	31.1	32.6	30.0	36.0	31.9	36.8	33.1	33.2
MTS0819	31.9	34.0	31.3	33.5	34.8	30.8	36.0	33.6	33.2
+# SY Wolf	35.1	33.1	31.1	28.5	35.9	31.5	37.5	33.9	33.3
Jagalene	33.0	32.2	32.4	29.0	34.0	31.3	40.2	35.4	33.4
Broadview	32.7	33.5	33.7	30.3	31.4	32.1	38.9	35.0	33.5
Settler CL	33.3	34.0	32.7	35.1	33.9	32.2	36.4	32.9	33.8
MTS0808	33.9	34.1	31.1	27.2	38.5	33.0	38.5	36.2	34.1
Decade	33.3	36.2	34.0	32.7	32.3	31.7	40.0	34.1	34.3
Judee	35.5	33.1	31.0	31.8	36.8	31.7	39.3	35.2	34.3
+ MT0978	33.6	34.2	32.4	29.7	37.0	32.2	38.6	36.6	34.3
Accipiter	32.9	36.2	33.9	32.0	33.7	32.9	40.4	36.6	34.8
# WB-Quake	36.0	32.9	33.9	30.9	38.3	32.8	38.1	35.1	34.8
# Boomer	35.8	36.6	33.9	31.4	35.6	31.2	39.1	35.7	34.9
Robidoux	36.8	34.1	33.5	31.9	35.1	34.1	38.7	35.6	35.0
+ MT08146	33.7	36.2	33.9	31.6	36.9	31.8	40.7	35.6	35.1
Wahoo	33.2	32.9	36.3	36.4	31.4	34.2	39.7	36.7	35.1
MT0871	33.4	35.8	35.7	30.7	37.4	33.3	40.7	37.2	35.5
+ MT0990	35.7	38.1	33.5	32.1	35.0	33.0	39.4	37.5	35.5
+ MT08172	34.6	35.3	32.5	32.5	40.2	34.1	39.3	36.8	35.7
Yellowstone	37.0	34.5	32.2	31.5	38.3	33.1	40.5	38.3	35.7
+ MT08189	36.2	35.2	34.5	29.2	39.2	33.0	41.4	37.6	35.8
+ MT0954	35.4	36.4	36.5	31.9	34.3	33.5	41.9	38.4	36.0
+ MTCL1003	35.9	33.1	37.5	34.4	36.2	31.5	41.9	38.5	36.1
Promontory	35.7	34.2	34.6	35.3	37.9	33.4	42.0	36.1	36.2
+ McGill	35.8	35.6	37.3	31.7	33.5	34.1	45.1	37.5	36.3
Curlew	37.3	35.5	35.5	30.0	40.8	31.6	41.8	38.5	36.4
Hyalite (CL, HWW)	38.3	34.5	35.0	33.2	39.1	33.5	40.2	37.5	36.4
# Radiant	35.3	38.6	36.7	28.3	40.8	32.6	40.8	38.4	36.4
# WB-Matlock	35.8	37.9	35.9	32.7	34.1	33.5	42.1	39.8	36.5
+ MTCL1068	35.5	36.4	33.8	36.2	38.5	33.3	40.9	38.5	36.6
MTS0826	37.2	35.3	36.3	34.2	35.7	33.3	42.6	38.0	36.6
MT0866	37.5	36.4	37.9	31.7	35.0	34.5	43.0	38.5	36.8
Overland	35.3	33.2	36.9	42.2	35.4	34.5	40.6	38.0	37.0
+ MTCL1067	38.0	35.6	34.8	34.0	40.0	33.4	43.3	38.2	37.2
MTS0832	36.6	34.3	36.5	36.0	35.6	34.4	44.5	39.6	37.2
Genou	37.9	35.2	39.2	34.8	35.9	35.6	43.6	38.7	37.6
Norris (CL)	38.3	36.1	38.9	33.1	37.0	35.3	44.8	38.6	37.8
Rampart	39.4	36.9	35.3	32.2	38.9	36.0	45.3	39.2	37.9
Bynum (CL)	38.3	34.9	39.4	34.8	40.7	36.1	42.9	36.8	38.0
+ MTW08168	38.1	37.7	35.4	34.1	43.6	34.5	42.6	40.2	38.3
Jerry	38.9	41.2	38.1	29.5	37.5	36.0	45.2	41.2	38.5
Peregrine	42.8	40.5	43.5	30.3	42.4	36.7	47.7	42.5	40.8
Average	35.3	34.9	34.3	31.6	36.2	32.9	40.4	36.6	35.3
LSD (0.05)	2.5	4.2	2.4	2.9	3.4	2.8	2.7	1.9	1.7
C. V. (%)	4.2	6.9	3.9	5.2	5.6	4.9	4.0	3.1	5.0
P-value (Varieties)	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0001

+ = new for 2011, # = 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 5. 2011 Intrastate Winter Wheat Test (Exp. 35): Multi-Location Grain Protein (%)									
Cultivar/Line	no harv.								7 Loc Avg.
	Bozeman bulk	Have poor	Sidney bulk	Williston RCB	Kalispell bulk	Moccasin bulk	Huntley bulk	Conrad bulk	
lattice efficiency	stands								
Bynum (CL)	13.2		13.0	12.9	13.1	10.1	13.1	11.9	12.5**
MTS0826	13.1		12.0	13.4*	14.1	9.7	13.0	11.2	12.4*
Rampart	13.6		12.2	13.6*	13.1	10.1	13.0	11.5	12.4*
+# BZ9WM07-1516	13.9		12.1	13.3*	14.1	9.5	12.2	11.0	12.3*
MTS0808	13.8		12.0	13.5*	13.2	9.5	12.4	10.1	12.1*
+ MTCL1003	13.7		12.7	12.1	12.8	10.1	12.3	10.4	12.0*
Carter	13.6		12.2	11.6	14.3	9.3	11.9	10.1	11.9*
Decade	12.7		10.3	13.9**	14.5	9.3	12.0	10.9	11.9*
Genou	13.4		12.8	12.6	13.2	8.7	12.3	10.5	11.9*
# WB-Matlock	12.5		12.0	12.3	13.4	9.9	12.5	11.0	11.9
# Art	13.6		12.6	12.4	13.3	9.1	11.4	10.0	11.8
Curlew	13.6		11.1	12.8	13.1	8.6	12.4	10.0	11.7
MT0866	12.5		12.0	11.8	14.1	8.8	11.8	11.0	11.7
+ MT0978	13.0		12.2	12.5	12.6	9.5	12.0	10.3	11.7
# AP 503 CL2	13.7		11.9	12.3	13.2	8.7	11.5	10.1	11.6
Bearpaw	12.7		11.1	12.5	13.9	8.8	12.3	10.1	11.6
+ MT08172	13.3		12.3	12.4	12.0	9.3	12.2	9.7	11.6
MT0871	13.5		12.1	12.3	12.4	9.4	12.1	9.3	11.6
MTS0832	12.5		11.1	12.6	14.7	8.6	11.9	10.0	11.6
Jerry	12.3		12.0	12.2	12.0	9.4	12.2	10.3	11.5
Judee	14.0		11.9	13.0*	12.2	8.9	11.6	9.2	11.5
MTS0819	13.5		12.2	12.0	12.9	8.7	11.1	9.8	11.5
Norris (CL)	12.1		12.1	12.0	12.9	8.6	12.2	10.9	11.5
# Radiant	12.9		11.5	12.3	11.7	9.5	12.3	10.2	11.5
CDC Falcon	12.6		12.1	12.1	11.5	9.5	12.0	9.7	11.4
Hyalite (CL, HWW)	13.2		12.0	12.2	12.5	8.8	11.8	9.5	11.4
+ MT08189	12.8		12.0	12.0	11.4	9.5	12.4	9.6	11.4
+ MTCL1067	13.0		11.5	11.7	12.1	9.2	12.1	10.2	11.4
Wahoo	12.2		11.8	11.3	14.8	8.5	11.6	9.5	11.4
Settler CL	12.2		11.7	12.0	12.8	9.3	11.3	9.8	11.3
+# SY Wolf	12.7		11.6	11.9	12.8	8.4	11.6	10.3	11.3
# Boomer	12.4		11.0	12.5	11.7	9.1	12.2	9.2	11.2
+ MT0954	11.7		10.6	11.8	14.0	9.0	11.7	9.3	11.2
+ MT0990	12.5		12.0	11.9	11.1	9.6	12.1	9.5	11.2
+ MTCL1068	12.5		12.0	11.8	11.7	8.7	11.9	9.6	11.2
Peregrine	12.5		10.7	11.9	12.2	8.7	11.9	10.6	11.2
Pryor	13.2		11.3	12.1	12.4	8.7	11.4	9.6	11.2
# WB-Quake	12.9		11.4	11.6	12.5	8.8	11.7	9.5	11.2
Broadview	12.6		10.7	11.5	12.3	8.8	11.8	9.8	11.1
Ledger	12.4		11.5	12.1	11.6	8.6	11.7	9.8	11.1
+ MT08146	13.2		11.3	11.7	12.1	8.8	11.5	9.0	11.1
+ MTW08168	12.7		10.6	11.7	11.7	9.0	11.9	10.3	11.1
Yellowstone	13.0		11.6	11.8	11.1	9.3	12.0	9.1	11.1
Jagalene	12.6		11.4	11.7	12.0	8.3	11.1	9.9	11.0
Overland	10.7		10.9	12.3	12.5	9.1	11.3	10.0	11.0
Robidoux	12.4		11.4	11.4	11.7	8.5	12.1	9.7	11.0
Promontory	12.4		10.9	11.9	11.1	8.6	11.2	9.3	10.8
Accipiter	12.2		10.9	11.6	10.8	8.7	11.8	8.7	10.7
+ McGill	12.1		10.6	11.7	12.2	8.6	11.0	8.9	10.7
Average	12.8		11.7	12.2	12.6	9.1	11.9	10.0	11.3
LSD (0.05)				1.0					
C. V. (%)				4.0					
P-value (Varieties)				0.0002					

+ = new for 2011, # = 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 6. 2011 Intrastate Winter Wheat Test (Exp. 35): Multi-Location Lodging (%)

Cultivar/Line	Kalispell RCB	Huntley LAT	2 Loc Avg.
lattice efficiency		114%	
# Art	0	0	0
+# BZ9WM07-1516	0	0	0
+ MT08172	0	0	0
Norris (CL)	0	0	0
Pryor	0	0	0
+# SY Wolf	0	0	0
# Boomer	0	1	1
CDC Falcon	0	1	1
MTS0819	0	1	1
MTS0832	0	1	1
Accipiter	0	2	1
Broadview	0	2	1
Ledger	0	2	1
+ MT08146	0	2	1
MT0866	0	2	1
+ MTW08168	0	2	1
Settler CL	0	2	1
MT0871	2	1	1
# Radiant	0	3	2
Yellowstone	0	3	2
+ MT08189	3	0	2
+ MT0990	3	0	2
# WB-Quake	3	0	2
+ MTCL1003	0	4	2
MTS0808	3	1	2
Decade	0	5	3
# WB-Matlock	0	6	3
+ MTCL1067	6	1	4
+ MTCL1068	0	7	4
Bearpaw	2	6	4
Jagalene	2	6	4
Jerry	0	8	4
+ McGill	4	4	4
Peregrine	2	10	6
Carter	0	13	7
Wahoo	0	14	7
Hyalite (CL, HWW)	8	6	7
+ MT0978	17	1	9
Overland	0	18	9
Promontory	12	7	9
Robidoux	12	9	10
+ MT0954	0	21	11
MTS0826	0	26	13
# AP 503 CL2	15	12	14
Bynum (CL)	11	18	15
Genou	0	29	15
Judee	26	7	16
Curlew	25	12	19
Rampart	28	19	24
Average	3.7	6.0	4.9
LSD (0.05)	10.7	16.0	12.6
C. V. (%)	176	156	128
P-value (Varieties)	<.0001		0.0428

+ = new for 2011, # = 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. 2011 Intrastate Winter Wheat Test (Exp. 35): Multi-Location Stem Solidness (5-25)

Cultivar/Line		Bozeman	Havre	Moccasin	Conrad	4 Loc Avg.
MTS0808	MT9908//Nuplains/MTS9862	18.0*	23.1*	23.5**	21.3*	21.5**
MTS0826	MT9524/G15048//Rampart	19.6**	21.3*	21.4*	22.6*	21.2*
Rampart	Montana, 1996	17.2*	23.1*	23.5*	20.3*	21.0*
Bearpaw	Montana, 2011	18.3*	23.2*	22.6*	19.7*	21.0*
+ MTCL1003	Jerry/CDC Teal 11A//MTCL0325	16.3*	20.8*	22.8*	23.1**	20.8*
Judee	Montana, 2011	15.2	21.5*	22.7*	21.3*	20.2*
MTS0832	92X73E70/MTW9911	13.8	23.5**	23.3*	18.5	19.8
# WB-Quake	Rampart/Kestrel (WestBred, 2011)	15.0	19.1	19.2	18.9*	18.1
Bynum (CL)	Montana/WestBred, 2005	14.2	19.3	19.1	18.5	17.8
MTS0819	93X312E14/NuHorizon	13.4	17.8	20.9	17.5	17.4
Genou	Montana, 2004	12.6	19.5	19.7	17.3	17.3
Carter	WestBred, 2006	11.5	13.9	14.6	11.4	12.9
Ledger	WestBred, 2004	9.3	10.9	8.1	6.0	8.6
CDC Falcon	Sask/WestBred, 1999	5.1	6.3	7.2	5.8	6.1
Average		14.2	18.8	19.2	17.3	17.4
LSD (0.05)		3.5	3.2	2.4	4.5	1.7
C. V. (%)		14.8	10.0	7.6	15.4	11.9
P-value (Varieties)		<.0001	<.0001	<.0001	<.0001	<.0001
% stems with tunneling						
		3.1	15.2	1.9	none	
Locations were significant (P= <.0001), there was a significant Entry x Location Interaction (P = .0186)						
+ = new for 2011, # = 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 8. 2011 Intrastate Winter Wheat Test (Exp. 35): Plant Disease Assessment

Cultivar/Line	Stripe Rust						Stem Rust		Tan Spot		WSMV	PLS
	(0-5, 0 = healthy)		%		KalisPELL	Ft Ellis	Ft. Ellis		(0-5, 0 = healthy)			
	Have 21-Jun	Moccasin 23-Jun	Bozeman 6-Jul	Bozeman 12-Jun			Score (0-4)	R/S 10-Aug	Have 21-Jun	Moccasin 23-Jun		
	2 reps						0=best				+ = present	
Accipiter	2.5	1.7	40.5	53.0	78.3	MR	0	R	2.0	3.0		
# AP 503 CL2	0.0**	4.1	5.0*	9.9*	25.0	R	0	R	1.5	2.0		
# Art	2.0	3.2	11.9*	14.5*	70.0	MR	0	R	1.0	2.0		
Bearpaw	1.5	1.3*	31.6	53.7	90.0	MS	0	R	1.5	1.3*		
# Boomer	2.5	0.9*	40.9	69.4	73.3	S	0	R	2.5	3.7		
Broadview	2.0	0.3*	33.2	50.1	86.3	S	0	R	1.5	3.9		+
Bynum (CL)	1.0	1.0*	5.5*	9.0*	53.3	R	1	MR	1.0	1.0*		
+# BZ9WM07-1516	2.5	2.4	29.0	56.6	99.0	S	4	VS	1.5	1.0*		
Carter	2.5	1.0*	43.2	79.5	97.7	S	0	R	1.0	2.9		
CDC Falcon	2.5	0.7*	38.7	36.8	80.0	MS/MR	0	R	2.5	2.3		+
Curlew	0.0**	1.7	2.0*	3.4*	21.0	R	2	S	1.5	2.0		
Decade	1.0	2.3	37.0	51.5	92.3	S	0	R	0.5**	0.6**	+	
Genou	2.5	2.4	20.0	43.4	83.3	S	2	S	1.5	2.0		
Hyalite (CL, HWW)	2.0	1.8	15.2*	27.2	63.3	MS	0	R	1.5	2.7	+	
Jagalene	1.5	3.5	11.2*	17.0*	55.0	MS	0	R	1.5	1.0*	+	
Jerry	2.5	1.5*	17.2*	54.8	83.3	VS	0	R	1.5	2.1		
Judee	0.5	0.1*	3.8*	3.7*	31.7	R	0	R	1.5	0.7*		
Ledger	2.0	1.0*	18.7*	48.4	83.3	S	1	MS	2.0	2.0	+	
+ McGill	2.0	2.8	41.3	65.2	88.3	MR/MS	0	R	2.0	2.4	+	
+ MT08146	1.0	0.0**	9.5*	10.0*	31.0	R	0	R	1.5	2.7		
+ MT08172	1.0	0.4*	3.3*	4.4*	32.7	R	1	MR	2.0	1.7*		
+ MT08189	0.0**	0.0**	2.5*	8.8*	39.3	MR	3	S	2.0	2.0	+	
MT0866	0.0**	2.8	16.6*	35.9	81.7	S	0	R	1.5	1.0*		
MT0871	1.5	1.3*	13.7*	21.1	56.7	MR	0	R	1.0	1.0*		
+ MT0954	0.5	2.2	43.8	69.7	86.7	MS	0	R	3.0	2.0	+	
+ MT0978	1.0	0.6*	6.8*	6.8*	58.3	R	0	R	1.0	1.3*	+	
+ MT0990	1.5	0.1*	5.4*	10.6*	53.3	MR	4	VS	2.5	2.0		
+ MTCL1003	no data	0.8*	7.2*	19.6	68.3	MR/MS	2	S	no data	1.1*		
+ MTCL1067	1.0	0.0**	4.1*	6.2*	48.3	R	1	MS	2.0	2.3	+	+
+ MTCL1068	1.0	1.0*	7.0*	13.8*	60.0	MR	0	R	2.0	2.0		
MTS0808	0.0**	0.1*	1.9**	1.2**	25.0	R	0	R	1.5	1.0*		
MTS0819	1.5	0.1*	7.8*	6.8*	51.7	R	0	R	1.0	1.0*		
MTS0826	1.0	1.7	23.6	41.1	50.0	MR	0	R	1.0	1.6*		
MTS0832	2.5	2.1	65.7	82.5	94.7	S	0	R	2.0	2.4		
+ MTW08168	1.0	0.0**	2.3*	4.1*	24.3	R	1	MR	1.5	1.7*		
Norris (CL)	2.0	1.9	29.4	44.2	89.7	S	1	MR	1.0	1.0*		
Overland	1.5	2.1	30.3	56.2	93.3	MS	0	R	1.5	1.3*		
Peregrine	1.0	1.7	2.9*	4.8*	65.0	R	tr	R	1.0	2.4		
Promontory	0.0**	0.1*	2.0*	3.2*	10.7**	R	2	S	1.5	4.0		
Pryor	2.0	3.6	72.4	83.0	73.3	VS	2	S	2.0	3.0		
# Radiant	1.0	0.2*	6.8*	13.4*	20.0	R	2	S	3.5	5.0		+
Rampart	1.0	0.4*	8.0*	16.0*	78.3	MR	0	R	1.5	2.0		
Robidoux	1.0	2.1	52.7	45.0	75.0	R	2	S	2.0	1.7*		
Settler CL	1.0	1.8	25.4	43.7	85.0	MS	0	R	1.5	1.7*		
+# SY Wolf	1.5	3.5	5.4*	18.5*	48.3	MS/MR	0	R	1.0	1.1*		
Wahoo	0.0**	2.3	48.0	66.9	97.7	S	0	R	1.5	2.7	+	
# WB-Matlock	3.0	2.7	64.4	74.2	80.0	S	0	R	2.0	2.3		
# WB-Quake	0.0**	0.7*	12.7*	10.3*	28.3	R	1	MR	2.0	1.4*		
Yellowstone	0.0**	0.2*	4.7*	4.9*	45.0	R	3	S	2.0	1.7*		
Average	1.3	1.4	21.1	32.1	63.4				1.6	2.0		
LSD (0.05)	1.8	1.6	17.0	17.3	6.3				1.0	1.2		
C. V. (%)	67.4	67.0	46.9	31.3	13.3				30.6	35.5		
P-value (Varieties)	0.0105	<.0001	<.0001	<.0001	<.0001				0.0010	<.0001		

1/ R = Resistant, MR = Mod. Resis., MS = Mod. Susc., S = Susceptible

2/ R = Resistant, M = Moderate, S = Susceptible

+ = new for 2011, # = 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)