

Project Title: Evaluation of winter wheat cultivar performance under continuous crop, crop-crop-fallow and crop-fallow systems in central Montana

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Objectives:

Evaluate relative performance winter wheat cultivars and development lines in central Montana crop environments.

Results:

2015 Central Montana crop year was generally good. Above average precipitation was received in Sep-Oct 2014 and May 2015, while the CARC crop year total was 1.40 inches below average. The CARC average crop year temperature was 2.5° F above the 103y average. Central Montana growing season precipitation was more plentiful at the On-Farm winter wheat trial locations away from Moccasin. On-farm winter wheat trials were established and harvested near Denton (after lentils), Geraldine (on fallow), Winifred (on fallow), Belt (after barley) and on the CARC (after hayed barley). Sawfly was not a major factor at any of the locations. Hessian fly was present on some entries at Geraldine. The Belt stand was thin due to heavy residue. Much of central Montana had low protein winter wheat. No definitive reason was identified for so much low protein winter wheat. It was speculated that that the much above average August 2014 precipitation, 6 to 9 inches, was a major cause. The unusual freezing stress, exhibited with yellowing leaves, in mid-early may is suspected of being a contributing factor.

The 2015 trial mean yields were greater than 37.5 bu/a at all locations with Geraldine having the high mean yield at 75.5 bu/a (Tables 1-5). No one variety was an outstanding producer at all locations. However, Yellowstone derived lines or Yellowstone were the top yielders at all locations. Other entries ranking in the top five for yield at one more locations included; SY Wolf, WB3768, Jerry, Decade, CDC Falcon, Colter and Broadview. Protein contents were low to very low at Denton, Winifred, and Belt. Moccasin had the high protein mean at 13.7% and was followed by Geraldine at 12.5%. The CARC location has been continuously cropped no-till, with a six crop (4 species) six year rotation, since 1996 and this system may have contributed to high protein content as CARC production fields produced low protein winter wheat.

Summary:

Multi-year summaries presenting the relative yields, test weights, and protein content of more popular cultivars and promising advanced lines are presented in tables 6 to 10. SY Clearstone, Northern, Yellowstone, and Decade have the high multi-year mean yield at one or more sites. Rampart, Yellowstone, Decade and Judee produced multiyear high test weights at one or more sites. Rampart had the high multiyear protein content at three sites, while Colter and Jerry were high at one site each.

Funding Summary:

Expenditure information to be provided by OSP. This project received no other grant support.

MWBC FY2016 Grant Submission Plans:

It is planned to submit this project for funding consideration in the next fiscal year.

Table 1. 2015 Moccasin No-till (CARC) Winter Wheat performance evaluation
Exp. 153870 Central Agricultural Research Center, Moccasin, Montana.

Entry	Cultivar/Line	Origin/Pedigree	Grain yield bu/ac	Test weight lb/bu	Heading date Julian	Plant height cm	Disease yellowing (0-10)	Protein content %
23	MT1286	Yellowstone*2/NE99445	47.4**	58.7	162	85	2.3	12.2
22	MT1265	Yellowstone*4/KS96WGRC40 (Lr41, wcm)	46.5*	55.1	163	89	1.7	14.2
1	Yellowstone	Montana 2005	46.2*	55.7	163	88	1.7	13.7
3	Decade	Montana/North Dakota, 2010	45.0*	55.8	160	85	2.0	12.9
21	MT1257	Yellowstone/Krichauff	44.9*	56.1	162	88	1.7	13.6
17	MT1138	W99-194/2*Yellowstone	44.2*	56.3	161	88	1.7	13.7
13	WB3768	Montana/WestBred, 2013	42.3*	57.4	163	97	2.0	12.7
20	MTS1224	Yellowstone//MTS0112/MTS0125	42.1	54.9	164	80	1.7	14.0
5	CDC Falcon	Sask/WestBred, 1999	41.5	55.2	162	75	3.0	14.1
16	MT1117	Yellowstone*3/KS96WGRC40	41.4	57.4	163	88	1.0	13.1
24	SY Wolf	Syngenta (AgriPro), 2010	41.1	57.4	160	77	3.7	13.0
11	SY Clearstone 2CL	Montana/Syngenta, 2012	40.8	54.6	162	88	2.7	13.9
10	Warhorse	Montana, 2013	40.8	54.3	161	82	1.3	13.6
15	MT1078	MT02113*4/MTS0359	40.7	53.9	162	79	4.0	12.6
9	Bearpaw	Montana, 2011	38.8	54.6	162	83	1.0	13.8
14	Northern	Montana, 2015	37.9	55.6	162	79	1.3	13.7
6	Jerry	North Dakota, 2001	37.8	54.5	161	92	1.7	13.3
12	Colter	Montana, 2013	37.0	57.7	163	91	1.7	13.4
8	WB-Quake	WestBred, 2011	35.3	54.2	162	80	2.0	14.1
25	Broadview	Alberta, 2009 (Meridian Seeds)	34.7	54.6	161	79	1.7	13.6
18	MTCS1204	MTCL0510/4/Paul/3/98X96C16cl/CDC Teal	32.2	57.2	162	82	3.3	13.8
2	Judee	Montana, 2011	30.8	54.8	163	84	1.3	14.2
19	MTS0826-63	MT9524/G15048//Rampart	29.6	56.3	162	86	1.7	14.3
26	MSWW14-001	CARC addition	25.1	57.2	159	91	5.0	14.5
4	Genou	Montana, 2004	23.8	55.9	162	87	1.7	14.5
7	Rampart	Montana, 1996	22.3	55.2	162	89	2.3	15.0
Average			38.1	55.8	162	85	2.1	13.7
LSD (0.05)			6.2		1.8	7.2	1.3	
C.V. (%)					0.7	5.2	37.6	
P-value (Varieties)			<.0001		0.0010	<.0001	<.0001	

** = 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)

Seeded: 26-Sep-14 (Hay barley stubble). Seed treatment Powerflex. Soil: 2" temp 18.5°C. Moist. Probe Depth: 20" .

Harvest: 23-July-15

Table 2. 2015 Denton No-till (CARC) Winter Wheat Performance Evaluation
Exp. 153871 Central Agricultural Research Center. Moccasin, Montana.

Entry	Cultivar/Line	Origin/Pedigree	Grain yield	Test weight	Heading date	Plant height	Yellow leaf	Protein content
			bu/ac	lb/bu	Julian	cm	(0-10)	%
20	MTS1224	Yellowstone//MTS0112/MTS0125	45.7**	57.5	160	72	1.7	10.4
25	Broadview	Alberta, 2009 (Meridian Seeds)	45.2*	56.1	158	72	1.7	12.3
15	MT1078	MT02113*4/MTS0359	45.0*	53.6	160	76	3.5	11.6
22	MT1265	Yellowstone*4/KS96WGRC40 (Lr41, v	45.0*	56.9*	160	76	2.0	10.8
12	Colter	Montana, 2013	44.0*	58.1*	160	78	2.0	11.9
3	Decade	Montana/North Dakota, 2010	43.1*	56.3*	158	73	1.3	11.9
17	MT1138	W99-194/2*Yellowstone	42.6*	56.3*	159	80	2.7	11.5
13	WB3768	Montana/WestBred, 2013	41.8*	58.4**	160	80	2.0	11.2
1	Yellowstone	Montana 2005	39.7*	56.2*	159	77	2.3	11.4
14	Northern	Montana, 2015	39.5*	57.0*	161	68	2.3	12.3
23	MT1286	Yellowstone*2/NE99445	39.1*	57.3*	160	72	2.0	11.1
9	Bearpaw	Montana, 2011	38.4*	54.7	157	68	1.7	11.2
10	Warhorse	Montana, 2013	38.2*	54.8	159	66	2.0	12.2
19	MTS0826-63	MT9524/G15048//Rampart	37.7*	55.3	159	78	3.0	11.7
6	Jerry	North Dakota, 2001	37.3*	55.4	158	75	2.7	11.8
5	CDC Falcon	Sask/WestBred, 1999	37.2*	55.4	159	68	2.3	12.0
11	SY Clearstone 2CL	Montana/Syngenta, 2012	36.5*	54.5	160	77	3.0	13.1
8	WB-Quake	WestBred, 2011	35.4	55.1	161	71	1.7	11.3
21	MT1257	Yellowstone/Krichauff	35.2	55.4	160	75	2.3	11.5
16	MT1117	Yellowstone*3/KS96WGRC40	33.8	56.2*	160	73	2.0	13.2
24	SY Wolf	Syngenta (AgriPro), 2010	32.4	56.8*	160	70	2.0	11.9
4	Genou	Montana, 2004	31.2	56.6*	158	79	2.0	11.4
7	Rampart	Montana, 1996	29.2	54.9	158	77	2.0	13.7
26	MSWW14-001	CARC addition	28.5	58.3*	157	87	3.0	11.5
2	Judee	Montana, 2011	28.2	57.4*	160	67	2.0	11.3
18	MTCS1204	MTCL0510/4/Paul/3/98X96C16c/CDC	24.4	57.2*	161	73	2.7	11.0
Average			37.5	56.2	159.4	74.1	2.2	11.7
LSD (0.05)			9.4	2.2	1.1	7.9	0.9	
C.V. (%)			15.4	1.9	0.4	6.6	25.5	
P-value (Varieties)			0.0003	0.0065	<.0001	0.0006	0.0034	

** = 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)

Seeded: 22-Sep-14 (Lentil stubble). Soil: 2" temp 18.5°C. Moist. Probe Depth: 24" (gravel)

Harvest: 31-July-15

Table 3. 2015 Geraldine No-till (CARC) Winter Wheat performance evaluation
Exp. 153872 Central Agricultural Research Center, Moccasin, Montana.

Entry	Cultivar/Line	Origin/Pedigree	Grain yield bu/ac	Test weight lb/bu	Heading date Julian	Plant height cm	Yellow leaves (0-10)	Lodging %	Broken stems ¹ %	Protein content %
1	Yellowstone	Montana 2005	86.7**	60.8	157	88	3.3	0	15	12.0
17	MT1138	W99-194/2*Yellowstone	83.0*	60.9	157	87	3.7	3	2	11.6
16	MT1117	Yellowstone*3/KS96WGRC40	82.9*	62.0	158	91	3.0	0	9	12.1
21	MT1257	Yellowstone/Krichauff	82.5*	60.1	157	87	2.7	0	4	12.5
24	SY Wolf	Syngenta (AgriPro), 2010	82.2*	61.2	150	81	3.7	2	1	12.3
12	Colter	Montana, 2013	81.1*	61.2	159	86	4.3	0	4	11.2
18	MTCS1204	MTCL0510/4/Paul/3/98X96C16cl/CDC Teal 11A/	81.0*	61.8	159	88	4.3	0	2	12.0
9	Bearpaw	Montana, 2011	80.5*	59.0	156	82	2.3	17	1	12.7
15	MT1078	MT02113*4/MTS0359	80.0*	57.9	158	81	5.3	0	2	11.8
23	MT1286	Yellowstone*2/NE99445	79.6*	61.2	157	86	4.0	0	2	11.9
13	WB3768	Montana/WestBred, 2013	79.5*	60.9	160	93	2.3	0	5	12.1
22	MT1265	Yellowstone*4/KS96WGRC40 (Lr41, wcm)	78.2*	60.5	159	89	2.7	2	3	12.1
2	Judee	Montana, 2011	77.7*	62.0	155	78	2.3	0	1	12.6
20	MTS1224	Yellowstone//MTS0112/MTS0125	77.3*	58.8	159	83	1.7	3	6	12.8
19	MTS0826-63	MT9524/G15048//Rampart	76.6*	60.3	159	90	2.7	7	1	12.7
14	Northern	Montana, 2015	75.8	58.6	159	85	2.3	0	3	14.1
3	Decade	Montana/North Dakota, 2010	74.9	60.1	156	82	1.7	2	88	12.8
6	Jerry	North Dakota, 2001	74.8	59.3	158	95	2.3	0	4	12.6
8	WB-Quake	WestBred, 2011	74.8	59.9	157	89	2.3	0	1	12.3
5	CDC Falcon	Sask/WestBred, 1999	73.2	59.4	157	77	5.3	0	2	13.2
11	SY Clearstone 2C	Montana/Syngenta, 2012	72.8	59.9	158	88	3.7	0	6	12.2
10	Warhorse	Montana, 2013	71.7	59.6	158	83	4.3	0	1	12.8
25	Broadview	Alberta, 2009 (Meridian Seeds)	66.1	59.8	158	84	3.7	1	2	12.0
4	Genou	Montana, 2004	64.7	58.6	157	80	3.0	23	1	13.1
7	Rampart	Montana, 1996	63.6	61.2	157	91	2.7	15	2	13.0
27	Broadview (#2)	CARC addition	59.8	58.5	159	81	4.0	8	3	13.5
26	MSWW14-001	CARC addition	57.2	61.1	155	99	5.0	0	2	14.1
Average			75.5	60.1	157.3	86	3.3	3.0	6.3	12.5
LSD (0.05)			10.6		1.1	6	1.7	12.1	7.9	
C.V. (%)			8.6		0.4	4	32.3	243	77	
P-value (Varieties)			<.0001		<.0001	<.0001	0.00	0.02	<.0001	

¹: may be due to a combination of Hessian fly, powdery mildew, stripe rust, fusarium root rot, etc.

** = 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)

Seeded: 22-Sep-14 (Chem fallow). Soil: 2" temp 18.5°C. Moist. Probe Depth: to handle bar.

Harvest: 23-July-15

**Table 4. 2015 Winifred No-till (CARC) Winter Wheat performance evaluation
Exp. 153874 Central Agricultural Research Center, Moccasin, Montana.**

Entry	Cultivar/Line	Origin/Pedigree	Grain Yield bu/ac	Test weight lb/bu	Heading date Julian	Plant height cm	Yellow leaf spots	Protein content %
20	MTS1224	Yellowstone//MTS0112/MTS0125	64.8**	57.9	162	77	2.3	9.0
15	MT1078	MT02113*4/MTS0359	60.5*	54.2	162	75	6.0	9.4
1	Yellowstone	Montana 2005	59.5*	56.8	160	79	4.3	8.9
3	Decade	Montana/North Dakota, 2010	59.3*	56.2	159	81	2.3	9.4
5	CDC Falcon	Sask/WestBred, 1999	55.9*	56.8	161	68	4.7	8.7
21	MT1257	Yellowstone/Krichauff	55.7*	57.1	159	80	4.0	8.2
12	Colter	Montana, 2013	55.6*	56.5	160	80	4.0	10.3
22	MT1265	Yellowstone*4/KS96WGRC40 (Lr41, wcm)	54.5*	57.4	161	77	4.3	8.4
24	SY Wolf	Syngenta (AgriPro), 2010	54.2*	55.7	159	74	3.3	10.3
14	Northern	Montana, 2015	53.3*	57.0	163	68	3.3	8.5
8	WB-Quake	WestBred, 2011	53.3*	56.7	162	71	2.0	8.4
23	MT1286	Yellowstone*2/NE99445	51.8*	57.4	160	72	4.7	8.8
9	Bearpaw	Montana, 2011	50.5	57.4	160	71	2.3	8.6
26	MSWW14-001	CARC addition	50.4	59.1	158	90	5.7	9.4
10	Warhorse	Montana, 2013	49.4	54.2	161	74	2.3	10.2
16	MT1117	Yellowstone*3/KS96WGRC40	49.3	56.4	161	80	4.0	9.4
6	Jerry	North Dakota, 2001	48.1	55.0	160	80	2.3	9.7
13	WB3768	Montana/WestBred, 2013	48.1	56.9	163	82	3.0	9.6
17	MT1138	W99-194/2*Yellowstone	47.6	56.6	160	70	5.7	8.5
19	MTS0826-63	MT9524/G15048//Rampart	47.5	56.8	161	87	3.0	10.0
2	Judee	Montana, 2011	45.5	59.5	161	75	2.7	8.7
4	Genou	Montana, 2004	44.8	57.1	161	87	2.3	9.2
18	MTCS1204	MTCL0510/4/Paul/3/98X96C16cl/CDC Teal 11A//I	43.7	58.7	162	75	4.0	9.5
25	Broadview	Alberta, 2009 (Meridian Seeds)	41.6	54.8	160	71	2.3	10.7
7	Rampart	Montana, 1996	39.4	55.3	160	81	2.7	10.9
11	SY Clearstone 2C	Montana/Syngenta, 2012	38.5	55.4	161	80	6.3	9.5
Average			50.9	56.7	160.7	77	3.6	9.3
LSD (0.05)			13.9		1.5	11	1.5	
C.V. (%)			16.7		0.6	9	0.6	
P-value (Varieties)			0.0405		<.0001	0.0053	<.0001	

** = 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)

Seeded: 23-Sep-14 (Chem fallow). Soil: 2" temp 11.9°C. Moist. Probe Depth: 3 feet.

Harvest: 31-July-15

Table 5. 2015 Belt No-till (CARC) Winter Wheat performance evaluation
Central Agricultural Research Center, Moccasin, Montana.

Entry	Cultivar/Line	Origin/Pedigree	Grain Yield	Test weight	Heading date	Plant height	Protein content
			bu/ac	lb/bu	Julian	cm	%
22	MT1265	Yellowstone*4/KS96WGRC40 (Lr41, w	58.8**	55.6	162	70	9.5
13	WB3768	Montana/WestBred, 2013	58.7*	56.2	161	79	9.3
24	SY Wolf	Syngenta (AgriPro), 2010	57.0*	55.8	160	77	10.0
19	MTS0826-63	MT9524/G15048//Rampart	56.4*	55.3	161	82	9.9
6	Jerry	North Dakota, 2001	55.8*	52.7	160	77	10.7
18	MTCS1204	MTCL0510/4/Paul/3/98X96C16cl/CDC T	54.6*	55.8	159	76	10.0
5	CDC Falcon	Sask/WestBred, 1999	54.2*	53.1	160	71	10.8
1	Yellowstone	Montana 2005	53.6*	54.6	162	70	9.8
9	Bearpaw	Montana, 2011	53.2*	51.6	159	70	10.4
12	Colter	Montana, 2013	53.2*	56.4	161	72	9.7
17	MT1138	W99-194/2*Yellowstone	51.4*	54.3	161	73	10.0
21	MT1257	Yellowstone/Krichauff	51.4*	51.6	161	75	10.6
11	SY Clearstone 2CL	Montana/Syngenta, 2012	51.4*	51.9	161	73	10.4
14	Northern	Montana, 2015	50.2*	50.3	161	68	11.8
16	MT1117	Yellowstone*3/KS96WGRC40	49.7*	54.9	161	71	10.4
26	MSWW14-001	CARC addition	49.7*	53.9	160	75	12.3
23	MT1286	Yellowstone*2/NE99445	48.9*	54.5	159	70	10.5
10	Warhorse	Montana, 2013	47.8*	54.8	162	69	10.5
20	MTS1224	Yellowstone//MTS0112/MTS0125	45.5	53.4	163	67	9.9
27	Broadview (#2)	CARC addition	44.5	50.1	159	82	12.7
3	Decade	Montana/North Dakota, 2010	43.7	52.6	160	69	10.7
4	Genou	Montana, 2004	42.8	54.8	160	77	10.2
15	MT1078	MT02113*4/MTS0359	41.6	51.6	164	72	11.8
7	Rampart	Montana, 1996	41.4	53.2	161	74	11.4
25	Broadview	Alberta, 2009 (Meridian Seeds)	41.0	53.2	160	67	9.9
2	Judee	Montana, 2011	36.6	52.9	161	66	11.3
8	WB-Quake	WestBred, 2011	27.1	52.8	164	61	10.7
Average			40.5		161	72.3	10.6
LSD (0.05)			12.2			8.6	
C.V. (%)			12.1			5.8	
P-value (Varieties)			0.00			0.01	

** = 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)

Seeded: 22-Sep-14 (Recrop after barley). Soil: 2" temp 14.5°C. Moist. Probe Depth: 2.5 feet.

Harvest: 1-Aug-15

Heavy straw residue interfered with stand establishment. WB-Quake plots affected the most.

Table 6 Three year summary of winter wheat cultivar performance near Moccasin in NTCC system.
Exp3870Mc Central Agricultural Research Center. Moccasin, Montana.

Cultivar	Grain Yield (bu/a)				Test Weight (lbs/bu)				Grain Protein (%)				Plant Height (cm)			
	2015	2014	2013	2y Ave.	2015	2014	2013	2y Ave.	2015	2014	2013	2y Ave.	2015	2014	2013	1y Ave.
Bearpaw	38.8	d	43.3	41.1	54.6	d	56.3	55.5	13.8	d	16.2	15.0	83	d	d	83
CDC Falcon	41.5	o	38.6	40.1	55.2	o	53.5	54.4	14.1	o	17.2	15.7	75	o	o	75
Colter	37.0	w	44.5	40.8	57.7	w	58.4	58.1	13.4	w	15.7	14.6	91	w	w	91
Decade	45.0	n	38.8	41.9	55.8	n	54.6	55.2	12.9	n	16.2	14.6	85	n	n	85
Genou	23.8	y	35.8	29.8	55.9	y	54.8	55.4	14.5	y	17.7	16.1	87	y	y	87
Jerry	37.8	b	36.3	37.1	54.5	b	54.7	54.6	13.3	b	17.0	15.2	92	b	b	92
Northern	37.9		44.0	41.0	55.6		55.4	55.5	13.7		16.6	15.2	79			79
Judee	30.8	r	41.5	36.2	54.8	r	55.4	55.1	14.2	r	16.3	15.3	84	r	r	84
Rampart	22.3	o	31.5	26.9	55.2	o	57.5	56.4	15.0	o	17.3	16.2	89	o	o	89
SYClearstone2CL	40.8	m	52.2	46.5	54.6	m	56.4	55.5	13.9	m	14.6	14.3	88	m	m	88
Warhorse	40.8	e	42.1	41.5	54.3	e	55.7	55.0	13.6	e	15.2	14.4	82	e	e	82
WB-Quake	35.3		35.1	35.2	54.2		56.2	55.2	14.1		15.6	14.9	80			80
Yellowstone	46.2		45.3	45.8	55.7		54.6	55.2	13.7		16.6	15.2	88			88
Trial Ave	36.8		40.7	38.7	55.2		55.7	55.4	13.9		16.3	15.09	85			85

Table 7 Three year summary of winter wheat cultivar performance near Denton in no-till CC system.
Exp3871Dn Central Agricultural Research Center. Moccasin, Montana.

Cultivar	Grain Yield (bu/a)				Test Weight (lbs/bu)				Grain Protein (%)				Plant Height (cm)			
	2015	2014	2013	2y Ave.	2015	2014	2013	2y Ave.	2015	2014	2013	2y Ave.	2015	2014	2013	2y Ave.
Bearpaw	38.4	t	41.8	40.1	54.7	t	59.5	57.1	11.2	t	12.6	11.9	68	59	71	66
CDC Falcon	37.2	i	45.6	41.4	55.4	i	58.5	57.0	12.0	i	11.4	11.7	68	57	66	64
Colter	44.0	c	41.5	42.8	58.1	c	59.1	58.6	11.9	c	13.2	12.6	78	63	71	71
Decade	43.1	k	44.1	43.6	56.3	k	59.3	57.8	11.9	k	12.0	12.0	73	57	74	68
Genou	31.2	v	40.5	35.9	56.6	v	59.8	58.2	11.4	v	12.2	11.8	79	67	79	75
Jerry	37.3	l	40.4	38.9	55.4	l	58.5	57.0	11.8	l	12.8	12.3	75	62	76	71
Northern	39.5	o	49.6	44.6	57.0	o	61.2	59.1	12.3	o	11.3	11.8	68	55	71	65
Judee	28.2		43.1	35.7	57.4		59.3	58.4	11.3		11.3	11.3	67	65	69	67
Rampart	29.2	w	35.4	32.3	54.9	w	59.9	57.4	13.7	w	12.8	13.3	77	66	79	74
SYClearstone2CL	36.5	h	44.5	40.5	54.5	h	59.6	57.1	13.1	h	11.7	12.4	77	70	74	73
Warhorse	38.2	e	41.5	39.9	54.8	e	59.1	57.0	12.2	e	12.4	12.3	66	60	66	64
WB-Quake	35.4	a	40.8	38.1	55.1	a	59.7	57.4	11.3	a	11.4	11.4	71	65	69	68
Yellowstone	39.7	t	47.2	43.5	56.2*	t	60.4	60.4	11.4	t	11.7	11.6	77	62	76	72
Trial ave	36.8		42.8	39.8	55.9		59.5		12.0		12.1	12.0	73	62	72	69

Table 8 Three year summary of winter wheat cultivar performance near Geraldine in a no-till fallow-ww-bly system.
Exp3872Gd Central Agricultural Research Center. Moccasin, Montana.

Cultivar	Grain Yield (bu/a)				Test Weight (lbs/bu)				Grain Protein (%)				Plant Height cm)			
	2015	2014	2013	3y Ave.	2015	2014	2013	3y Ave.	2015	2014	2013	3y Ave.	2015	2014	2013	3y Ave.
Bearpaw	80.5	59.4	87.2	75.7	59.0	63.4	60.9	61.1	12.7	13.1	9.9	11.9	82	76	86	82
CDC Falcon	73.2	63.9	86.5	74.5	59.3	63.4	60.0	60.9	13.2	12.2	10.6	12.0	77	71	81	77
Colter	81.1	70.7	87.8	79.9	61.0	63.6	61.5	62.0	11.2	11.8	9.9	11.0	86	85	91	87
Decade	74.9	59.7	88.2	74.3	60.1	65.2	61.4	62.2	12.8	12.8	10.2	11.9	82	85	89	85
Genou	64.7	62.5	68.4	65.2	61.0	63.1	60.7	61.6	13.1	12.1	10.9	12.0	80	87	99	89
Jerry	74.8	53.7	81.3	69.9	59.3	63.3	59.2	60.6	12.6	13.4	10.4	12.1	95	90	104	96
Northern	75.8	68.4	95.5	79.9	58.6	63.5	61.2	61.1	14.1	12.9	9.0	12.0	85	82	86	84
Judee	77.7	68.2	83.3	76.4	62.0	62.7	61.6	62.1	12.6	11.8	10.4	11.6	78	83	81	81
Rampart	63.6	65.8	67.6	65.7	61.2	64.1	60.3	61.9	13.0	12.6	10.9	12.2	91	87	99	92
SY Clearstone 2CL	72.8	69.6	89.0	77.1	59.9	63.7	60.7	61.4	12.2	10.8	9.5	10.8	88	95	91	92
Warhorse	71.7	60.1	85.8	72.5	59.6	63.5	60.6	61.2	12.8	13.7	9.6	12.0	83	79	84	82
WB-Quake	74.8	64.4	82.2	73.8	59.9	63.9	60.7	61.5	12.3	12.5	9.7	11.5	89	80	84	84
Yellowstone	86.7	71.1	95.0	84.3	60.8	63.4	60.9	61.7	12.0	11.9	10.8	11.6	88	87	89	88
Trial Ave	74.8	64.4	84.4	74.6	60.1	63.6	60.7	61.5	12.7	12.4	10.1	11.7	85	84	90	86

Table 9 Three year summary of winter wheat cultivar performance near Winifred in a NTCF system.
Exp3874Wn Central Agricultural Research Center. Moccasin, Montana.

Cultivar	Grain Yield (bu/a)				Test Weight (lbs/bu)				Grain Protein (%)				Plant Height cm)			
	2015	2014	2013	3y Ave.	2015	2014	2013	3y Ave.	2015	2014	2013	3y Ave.	2015	2014	2013	3y Ave.
Bearpaw	50.5	40.1	63.7	51.4	56.8	60.6	61.5	59.6	8.6	13.5	10.7	10.9	71	60	74	68
CDC Falcon	55.9	45.5	59.3	53.6	55.3	61.7	60.7	59.2	8.7	12.6	10.3	10.5	81	67	69	72
Colter	55.6	43.5	51.6	50.2	56.3	63.2	60.0	59.8	10.3	12.3	10.8	11.1	68	76	79	74
Decade	59.3	45.0	74.7	59.7	55.8	61.8	62.0	59.9	9.4	15.0	9.8	11.4	80	61	79	73
Genou	44.8	43.4	46.6	44.9	56.8	60.8	61.8	59.8	9.2	14.2	11.4	11.6	87	76	84	82
Jerry	48.1	37.2	54.0	46.4	54.0	60.1	60.6	58.2	9.7	13.5	10.2	11.1	80	81	102	87
Northern	53.3	46.9	73.3	57.8	54.7	62.0	61.6	59.4	8.5	13.5	9.8	10.6	68	68	79	72
Judee	45.5	40.1	59.3	48.3	57.0	62.0	61.8	60.3	8.7	15.0	9.7	11.1	75	71	74	73
Rampart	39.4	41.4	46.9	42.6	55.3	61.0	62.7	59.7	10.9	14.1	11.5	12.2	81	74	81	79
SY Clearstone 2CL	38.5	38.8	54.7	44.0	54.0	61.1	60.0	58.4	9.5	14.9	10.0	11.5	80	73	84	79
Warhorse	49.4	42.4	52.8	48.2	55.6	62.0	60.2	59.3	10.2	13.2	10.2	11.2	74	62	76	71
WB-Quake	53.3	40.2	55.0	49.5	57.1	61.8	61.7	60.2	8.4	14.5	10.0	11.0	71	73	74	73
Yellowstone	59.5	41.3	61.5	54.1	57.2	61.1	59.8	59.4	8.9	14.6	10.3	11.3	79	70	81	77
Trial Ave	50.2	42.0	58.0	50.1	55.8	61.5	61.1	59.5	9.3	13.9	10.4	11.2	77	70	80	75

Table 10 Three year summary of winter wheat cultivar performance near Belt in a no-till CC system.
Exp3875Bt Central Agricultural Research Center. Moccasin, Montana.

Cultivar	Grain Yield (bu/a)				Test Weight (lbs/bu)				Grain Protein (%)				Plant Height (cm)			
	2015	2014	2013	3y Ave.	2015	2014	2013	3y Ave.	2015	2014	2013	3y Ave.	2015	2014	2013	3y Ave.
Bearpaw	53.2	55.9	30.0	46.4	51.6	62.7	55.7	56.7	10.4	12.1	11.8	11.4	70	70	74	71
CDC Falcon	54.2	55.2	25.6	45.0	53.1	62.7	53.4	56.4	10.8	11.8	13.0	11.9	71	64	71	69
Colter	53.2	55.9	23.6	44.2	56.4	62.4	53.4	57.4	9.7	11.6	11.9	11.1	72	84	79	78
Decade	43.7	54.9	31.1	43.2	52.6	64.2	54.3	57.0	10.7	12.4	11.4	11.5	69	73	79	73
Genou	42.8	58.6	18.1	39.8	54.8	63.6	52.3	56.9	10.2	13.0	12.8	12.0	77	80	81	79
Jerry	55.8	55.4	28.8	46.7	52.7	62.1	54.6	56.5	10.7	13.6	12.1	12.1	77	90	86	85
Northern	50.2	59.3	32.5	47.3	50.3	62.1	57.8	56.7	11.8	13.0	11.1	12.0	68	81	81	77
Judee	36.6	51.1	23.4	37.0	52.9	63.6	55.1	57.2	11.3	11.4	11.6	11.4	66	70	81	72
Rampart	41.4	48.4	21.9	37.2	53.2	63.4	53.1	56.6	11.4	10.9	13.2	11.8	74	75	84	78
SYClearstone2CL	51.4	56.5	31.1	46.3	51.9	62.3	54.5	56.2	10.4	12.3	11.0	11.2	73	80	81	78
Warhorse	47.8	51.9	31.0	43.6	54.8	61.6	55.3	57.2	10.5	13.5	11.5	11.8	69	69	69	69
WB-Quake	27.1	51.3	25.7	34.7	52.8	63.7	52.9	56.5	10.7	11.7	12.2	11.5	61	71	74	69
Yellowstone	53.6	62.7	26.9	47.7	54.6	62.5	55.6	57.6	9.8	12.0	12.5	11.4	70	77	84	77
Trial Ave	47.0	55.2	26.9	43.0	53.2	62.8	54.5	56.8	10.6	12.3	12.0	11.6	70	76	79	75