

Table 11. 2013-2015 Montana Intrastate Winter Wheat (Exp. 35): Cereal Quality Evaluations

2013-2015 Montana Winter Wheat Intrastate Mill and Bake

ID										Flour					
	PPO			Hardness			Protein %			Yield %			Protein %		
	2015	2yr	3yr	2015	2yr	3yr	2015	2yr	3yr	2015	2yr	3yr	2015	2yr	3yr
Bearpaw	0.280	0.227	0.279	81.7	81.6	82.3	12.7	12.9	13.2	69.8	70.6	70.8	11.2	11.5	11.9
Brawl CL Plus	0.289			68.0			12.8			66.7			11.7		
Byrd	0.315			66.5			11.5			68.8			10.1		
Colter	0.280	0.233	0.260	79.0	79.3	79.5	12.6	12.9	13.1	68.0	69.3	70.1	11.2	11.5	11.8
Cowboy	0.213	0.191	0.224	66.4	69.6	70.2	11.4	11.7	12.0	66.7	68.0	68.4	9.6	10.0	10.4
Decade	0.280	0.253	0.287	70.4	73.2	74.4	12.8	12.8	13.2	67.6	69.3	69.7	11.3	11.6	12.0
Freeman	0.367	0.302		54.9	59.5		11.8	12.1		66.8	67.9		10.3	10.6	
Judee	0.277	0.246	0.276	79.5	80.6	80.7	12.7	12.9	13.2	68.0	69.4	69.8	11.4	11.7	12.1
Keldin	0.327	0.282		66.8	67.6		12.1	12.5		67.7	69.4		10.7	11.1	
Loma	0.188	0.154		79.8	81.8		12.1	12.5		71.6	71.9		10.8	11.3	
MT1138	0.288	0.236	0.267	79.3	78.5	78.2	12.1	12.4	12.7	67.8	69.2	69.8	10.6	11.0	11.4
MT1257	0.232	0.215		80.8	81.3		11.8	12.3		70.3	70.9		10.4	11.0	
MT1265	0.242	0.198		75.1	76.5		12.2	12.5		69.6	70.6		10.9	11.3	
MT1332	0.283			75.9			11.6			68.5			10.3		
MT1348	0.096			76.8			11.9			69.2			10.7		
MT1354	0.177			78.1			12.2			68.8			11.0		
MT1356	0.276			77.9			11.9			67.9			10.5		
MTCL1131	0.265	0.223	0.238	76.7	79.7	80.5	11.8	12.3	12.6	69.2	70.1	70.5	10.6	11.1	11.5
Northern	0.077	0.081	0.097	88.0	87.9	87.5	12.5	12.8	13.1	70.4	70.8	71.1	11.4	11.7	12.0
SY Clearstone 2CL	0.293	0.247	0.297	79.9	79.7	78.7	12.0	12.3	12.7	67.8	69.2	69.2	10.6	10.9	11.3
SY Monument	0.190			75.3			11.7			68.3			10.3		
SY Sunrise	0.305			61.7			12.3			66.1			10.6		
SY Wolf	0.269	0.222	0.268	73.8	75.6	75.7	12.1	12.4	12.8	66.8	68.7	69.5	10.6	11.1	11.5
T158	0.304	0.261		66.5	68.0		11.7	11.9		70.0	70.9		10.4	10.5	
Warhorse	0.268	0.238	0.261	90.1	91.5	92.0	13.0	13.2	13.4	68.4	69.3	69.8	11.7	12.1	12.3
WB3768	0.087	0.085	0.096	77.4	77.4	77.4	12.5	12.6	12.9	69.2	69.8	70.2	11.3	11.4	11.7
WB4059CLP	0.328	0.270		83.2	85.2		13.0	13.1		69.2	69.5		11.7	11.8	
WB4614	0.293	0.265		76.9	77.9		12.4	12.5		69.3	70.7		10.8	11.0	
WB4623CLP	0.183			79.6			12.9			67.0			11.5		
Yellowstone	0.241	0.199	0.208	79.1	80.5	79.7	12.1	12.3	12.5	68.5	69.7	70.3	10.7	11.0	11.4
Average	0.250	0.220	0.235	75.5	77.8	79.8	12.2	12.5	12.9	68.5	69.8	69.9	10.8	11.2	11.6
LSD (0.05)	0.064	0.040	0.036	5.0	3.1	2.6	0.7	0.4	0.3	1.8	1.0	0.8	0.7	0.5	0.3
C.V.	18.2	18.5	19.0	4.7	4.0	4.0	4.2	3.6	2.8	1.9	1.5	1.4	4.9	4.3	3.6

bold,bold-underlined,ns denotes statistical significance at P <= 0.05, highest value, and non-significance within column, respective

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ID	Flour color									Whole Wheat Ash (%)			Flour Ash (%)		
	L*			a*			b*			2015	2yr	3yr	2015	2yr	3yr
	2015	2yr	3yr	2015	2yr	3yr	2015	2yr	3yr						
Bearpaw	89.8	90.0	90.0	-1.72	-1.59	-1.45	10.9	10.9	10.6	1.44	1.40	1.45	0.43	0.42	0.43
Brawl CL Plus	90.2			-1.94			11.2			1.48			0.40		
Byrd	90.3			-1.84			11.1			1.42			0.40		
Colter	89.9	89.9	89.8	-1.49	-1.34	-1.24	11.4	11.3	11.2	1.45	1.46	1.49	0.43	0.42	0.43
Cowboy	90.4	90.6	90.5	-1.90	-1.77	-1.63	11.1	11.1	10.9	1.48	1.45	1.48	0.43	0.42	0.43
Decade	90.6	90.6	90.4	-1.41	-1.26	-1.14	8.9	9.0	9.0	1.47	1.43	1.49	0.41	0.41	0.42
Freeman	90.7	90.8		-1.73	-1.62		10.1	10.3		1.47	1.46		0.39	0.39	
Judee	90.0	90.1	89.9	-1.73	-1.57	-1.46	11.1	11.0	10.9	1.48	1.47	1.51	0.41	0.41	0.42
Keldin	90.3	90.4		-1.34	-1.22		9.5	9.6		1.41	1.39		0.44	0.43	
Loma	89.6	89.6		-2.23	-2.05		13.7	13.6		1.41	1.43		0.42	0.42	
MT1138	89.9	90.0	89.9	-1.70	-1.53	-1.39	11.3	11.3	11.1	1.45	1.43	1.49	0.43	0.43	0.44
MT1257	90.0	89.9		-1.44	-1.27		10.3	10.4		1.37	1.39		0.42	0.43	
MT1265	89.7	89.8		-1.39	-1.25		10.5	10.6		1.40	1.41		0.43	0.43	
MT1332	89.8			-1.66			11.3			1.44			0.44		
MT1348	89.7			-1.90			12.2			1.40			0.42		
MT1354	89.7			-1.48			11.0			1.45			0.44		
MT1356	89.8			-1.49			10.9			1.42			0.44		
MTCL1131	89.8	89.9	89.8	-1.42	-1.25	-1.14	10.3	10.3	10.1	1.42	1.42	1.47	0.43	0.43	0.44
Northern	89.3	89.4	89.5	-1.61	-1.44	-1.32	11.7	11.7	11.2	1.42	1.43	1.50	0.45	0.45	0.46
SY Clearstone 2CL	89.6	89.9	89.8	-1.63	-1.49	-1.34	11.0	10.9	10.7	1.42	1.42	1.47	0.44	0.43	0.44
SY Monument	90.1			-1.65			10.7			1.41			0.39		
SY Sunrise	90.4			-1.78			10.5			1.45			0.40		
SY Wolf	90.2	90.2	90.1	-2.00	-1.85	-1.69	11.7	11.7	11.5	1.43	1.42	1.46	0.41	0.41	0.42
T158	90.3	90.4		-1.80	-1.67		11.0	11.0		1.38	1.35		0.39	0.39	
Warhorse	89.5	89.6	89.6	-1.63	-1.52	-1.40	11.3	11.4	11.2	1.46	1.42	1.46	0.44	0.44	0.45
WB3768	89.6	89.8	89.7	-1.83	-1.65	-1.50	12.4	12.1	11.8	1.43	1.41	1.45	0.44	0.44	0.44
WB4059CLP	89.1	89.3		-1.80	-1.59		12.3	12.0		1.44	1.43		0.43	0.42	
WB4614	89.9	90.1		-1.85	-1.73		11.8	11.8		1.49	1.46		0.42	0.42	
WB4623CLP	90.1			-1.57			9.9			1.45			0.42		
Yellowstone	89.6	89.8	89.7	-1.52	-1.38	-1.23	10.9	10.9	10.6	1.41	1.40	1.45	0.43	0.43	0.44
Average	89.9	90.0	89.9	-1.68	-1.52	-1.38	11.1	11.1	10.8	1.43	1.42	1.47	0.42	0.42	0.43
LSD (0.05)	0.4	0.2	0.2	0.14	0.09	0.07	0.4	0.3	0.3	ns	0.06	0.04	0.02	0.01	0.01
C.V.	0.3	0.3	0.3	6.1	5.8	5.9	2.8	2.9	3.1	4.7	4.0	3.6	2.9	2.8	2.6

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ID	Mixograph								
	Tolerance			Mix time (min.)			Absorption %		
	2015	2yr	3yr	2015	2yr	3yr	2015	2yr	3yr
Bearpaw	4.0	3.5	3.8	4.3	4.3	4.1	58.4	59.5	60.5
Brawl CL Plus	3.5			4.9			60.7		
Byrd	4.0			7.1			60.6		
Colter	<u>4.8</u>	<u>5.0</u>	<u>5.0</u>	8.6	9.0	9.3	62.3	63.9	65.0
Cowboy	4.0	4.0	4.0	3.9	3.9	4.2	57.7	59.6	60.9
Decade	<u>4.8</u>	<u>4.9</u>	<u>4.8</u>	9.8	8.4	8.3	62.8	63.3	65.2
Freeman	4.0	4.3		6.4	6.0		59.4	59.8	
Judee	4.0	4.3	4.2	5.2	5.3	5.1	60.0	61.0	61.7
Keldin	4.3	4.0		5.1	4.6		59.6	60.6	
Loma	4.3	4.3		6.4	6.3		61.7	62.7	
MT1138	4.3	<u>4.6</u>	<u>4.6</u>	9.3	8.4	8.4	62.4	62.9	63.4
MT1257	4.0	4.3		8.1	7.7		61.6	62.3	
MT1265	4.0	<u>4.4</u>		9.2	8.6		62.9	63.1	
MT1332	4.5			7.9			59.5		
MT1348	4.0			4.9			60.3		
MT1354	4.3			9.9			63.3		
MT1356	3.8			10.2			62.3		
MTCL1131	4.5	4.3	4.3	6.1	5.9	6	60.8	62.2	63.0
Northern	3.3	3.6	3.7	3.8	3.7	3.8	60.6	61.1	62.0
SY Clearstone 2CL	3.8	3.8	3.9	5.9	5.9	6.0	60.5	60.7	61.8
SY Monument	4.3			9.7			61.0		
SY Sunrise	3.5			3.7			60.0		
SY Wolf	3.0	2.5	2.5	5.0	4.4	4.3	57.3	58.0	58.9
T158	3.0	2.8		3.4	3.1		58.5	59.0	
Warhorse	3.8	3.5	3.7	4.8	4.7	4.5	60.6	62.0	62.2
WB3768	4.3	4.3	4.4	6.2	6.2	6.1	60.9	61.7	62.9
WB4059CLP	3.3	3.5		3.6	3.4		60.0	60.2	
WB4614	4.3	4.1		4.2	3.9		59.0	60.0	
WB4623CLP	4.3			5.0			61.1		
Yellowstone	4.5	<u>4.8</u>	<u>4.8</u>	8.1	7.7	7.6	62.0	62.2	63.8
Average	4.0	4.0	4.1	6.3	5.8	6.0	60.6	61.2	62.4
LSD (0.05)	0.8	0.7	0.5	1.8	1.0	0.8	2.2	1.5	1.2
C.V.	14.4	16.4	15.5	19.6	17.8	16.5	2.6	2.4	2.5

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Table 11. 2013-2015 Montana Intrastate Winter Wheat (Exp. 35): Cereal Quality Evaluations

ID	Bake											
	Mix time (min.)			Absorption %			Loaf volume (cc)			Crumb grain (0-9)		
	2015	2yr	3yr	2015	2yr	3yr	2015	2yr	3yr	2015	2yr	3yr
Bearpaw	6.8	6.7	6.7	68.7	69.7	70.6	953	992	1029	4.5	6.3	6.5
Brawl CL Plus	9.4			71.4			1019			6.3		
Byrd	20.3			72.5			988			5.8		
Colter	20.4	19.8	19.7	75.0	75.7	76.6	996	1034	1061	5.8	6.5	6.7
Cowboy	6.8	8.0	8.3	67.4	69.2	70.7	885	924	963	5.3	6.5	6.7
Decade	23.8	20.9	21.0	74.8	74.3	76.0	1016	1051	1070	5.8	6.8	7.0
Freeman	12.3	11.4		71.2	70.6		915	944		4.8	6.1	
Judee	10.3	9.7	9.3	70.7	71.3	71.9	1101	1136	1158	5.3	6.6	7.0
Keldin	10.6	9.1		69.9	70.8		930	998		5.0	6.5	
Loma	16.9	18.3		74.2	74.4		1058	1106		5.8	6.8	
MT1138	19.3	17.4	16.6	73.1	73.3	73.9	985	1047	1080	6.5	7.0	7.3
MT1257	16.5	15.6		72.7	72.9		1011	1064		6.0	6.9	
MT1265	17.8	17.1		74.8	74.4		1006	1054		6.3	7.1	
MT1332	15.0			70.9			975			5.0		
MT1348	12.5			71.1			976			5.8		
MT1354	21.4			75.4			999			5.5		
MT1356	19.5			74.4			1008			5.3		
MTCL1131	10.9	12.0	12.0	70.7	72.3	73.2	1020	1054	1092	4.8	6.0	6.5
Northern	6.2	5.9	6.0	70.1	70.8	71.8	1029	1069	1100	5.3	6.5	6.7
SY Clearstone 2CL	10.1	9.6	9.9	71.5	71.3	72.3	998	1036	1063	5.3	6.5	6.8
SY Monument	20.5			73.2			955			6.3		
SY Sunrise	5.7			69.9			905			6.3		
SY Wolf	7.3	6.3	6.4	67.7	68.2	69.0	924	957	999	5.5	6.6	6.9
T158	5.3	4.3		69.0	68.8		910	947		6.3	6.8	
Warhorse	8.6	7.8	7.5	71.7	72.8	72.8	1008	1063	1092	5.5	6.8	6.9
WB3768	12.9	13.5	13.5	71.2	71.9	73.4	990	1012	1033	5.3	6.3	6.7
WB4059CLP	5.5	4.9		69.8	70.0		1008	1031		4.8	6.0	
WB4614	8.1	6.9		69.7	70.3		1025	1049		5.5	6.4	
WB4623CLP	8.9			71.4			1078			5.0		
Yellowstone	17.0	16.1	16.4	73.8	73.6	74.7	994	1031	1060	6.0	6.8	7.1
Average	12.9	11.5	11.8	71.6	71.7	72.8	989	1028	1062	5.5	6.5	6.8
LSD (0.05)	5.0	2.9	2.1	2.3	1.5	1.3	67	39	34	ns	ns	ns
C.V.	27.5	25.7	21.8	2.2	2.1	2.2	4.8	3.8	3.9	16.6	12.1	10.9

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