

Table 21. 2010 Sawfly Winter Wheat Nursery Mill & Bake (Exp. 5801)

Location: Bozeman, MT

Sample No. x = lines in 2012 tests	Variety	Pedigree	Class	PPO	Single kernel hardness	Wheat Protein, % (12% m.b.)	Flour Yield, %	Flour Protein, % (14% m.b.)	Color			Wheat Ash, %	Flour Ash, %	Mixograph Type	Mixing Tolerance	Mixo Mixing Time, min	Mixo Water Absorption, %	Bake Mixing Time, min	Bake Water Absorption, %	Loaf Volume	Crumb Grain Score
									L* Brightness	a* Green - Red	b* Blue - Yellow										
1	Rampart	check	HRW		60.8	15.4	72.3	13.5	90.2	-1.48	11.1	1.55	0.39	M	2	6.5	70.8	20.5	79.5	1090	
2	Genou	check	HRW		64.1	14.8	72.1	13.1	90.6	-1.31	9.8	1.52	0.39	MH	3	5.9	68.4	18.4	77.6	1150	
3	CDC Falcon	check	HRW		59.9	14.3	66.8	12.1	90.4	-0.99	8.8	1.60	0.42	M	4	4.9	65.7	9.6	75.4	1050	
4	Yellowstone	check	HRW		60.6	13.5	70.6	11.9	90.1	-1.04	9.7	1.63	0.41	M	5	6.9	66.3	13.6	76.5	1125	
5	Judee	93X312E14/NuHorizon	HRW		67.0	14.6	69.2	12.6	90.1	-1.33	10.5	1.70	0.41	M	4	6.2	66.8	11.1	76.5	1240	
6	Bearpaw	DMS/Rampart//Pronghorn/3/2*Ram	HRW		67.6	14.8	70.2	12.8	90.6	-1.26	9.6	1.61	0.39	M	2	4.4	66.8	7.6	76.5	1100	
7	MTS0808	MT9908//Nuplains/MTS9862	HRW		77.2	15.0	70.6	13.2	89.8	-1.22	10.3	1.57	0.43	M	2	4.3	67.3	7.7	76.0	1115	
8	MTS0819	93X312E14/NuHorizon	HRW		77.7	14.2	66.2	12.3	90.2	-1.65	11.3	1.68	0.39	M	3	7.1	67.8	10.9	79.5	1185	
9	MTS0826	MT9524/G15048//Rampart	HRW		60.8	15.2	71.3	13.2	90.5	-1.77	11.4	1.64	0.39	M	2	7	69.5	20.7	78.7	1205	
10	MTS0832	92X73E70/MTW9911	HRW		75.1	13.6	69.6	11.9	90.7	-1.67	11.3	1.52	0.38	M	5	6.8	68.4	15.5	77.6	1170	
11	MTCL1003	Jerry/CDC Teal 11A//MTCL0325	HRW		61.2	14.4	71.5	12.6	90.4	-1.32	10.3	1.55	0.39	M	2	4.4	67.4	9.4	76.6	1205	
12	MTS1011	MTS0122//Genou/MTsw0101	HRW		55.1	13.5	72.8	11.8	90.4	-0.88	8.2	1.52	0.39	M	3	7.6	66.2	23.8	76.4	1020	
13	MTS1014	Genou/MTsw0102//93X269E79-1	HRW		63.0	13.6	71.6	11.9	90.0	-1.17	10.1	1.66	0.40	M	3	6.3	66.2	13.8	77.4	1055	
14	MTS1019	MT0192//NE98632/Genou	HRW		57.6	13.4	65.9	11.3	91.2	-1.40	9.3	1.48	0.40	M	3	5	65.4	11.9	75.6	1065	
15	MTS1020	MTW01133//NW97S154/MTS0019	HWW		75.5	13.7	64.4	11.5	90.5	-1.52	10.8	1.72	0.41	M	6	6.8	68.2	12.1	78.9	1100	
16	MTS1021	MTW01133//NW97S154/MTS0019	HRW		68.1	13.6	65.1	11.7	90.2	-1.41	10.8	1.75	0.41	M	5	7.4	67.9	13.2	77.6	1215	
17	MTS1024	MT02113*4/MTS0359	HRW		63.9	12.9	67.6	11.2	90.4	-1.23	10.1	1.62	0.40	MH	4	6	66.2	13.4	78.4	1135	
18	MTS1025	MTS0126//NuSky/ID551	HRW		59.4	13.4	71.2	11.7	90.4	-1.94	12.7	1.63	0.37	M	4	4.8	66.7	10.9	76.4	1125	
19	MTS1026	MTS0205/MT01134	HRW		56.1	14.0	70.0	11.7	90.4	-1.30	10.7	1.65	0.39	M	3	4.3	68.1	8.4	76.8	1125	
20	MTS1027	93X512cE61-1/MT0281	HRW		71.2	13.4	68.2	11.4	90.2	-1.49	10.8	1.63	0.41	M	4	4.5	65.7	7.7	75.4	1115	
21	MTS1028	MTW01133*2//MT02113/MTS0359	HRW		65.1	14	67.4	12.4	90.8	-1.83	11.9	1.66	0.40	M	6	8.5	68.7	13.6	78.4	1165	
MIN					55.1	12.9	64.4	11.2	89.8	-1.94	8.2	1.48	0.37		2	4.3	65.4	7.6	75.4	1020	
MAX					77.7	15.4	72.8	13.5	91.2	-0.88	12.7	1.75	0.43		6	8.5	70.8	23.8	79.5	1240	
AVE					65.1	14.1	69.3	12.2	90.4	-1.39	10.4	1.61	0.40		3.6	6.0	67.4	13.0	77.2	1131	

Table 22. 2010 Sawfly Winter Wheat Nursery Mill & Bake (Exp. 5802)

Location: Havre, MT

Sample No. x = lines in 2012 tests	Variety	Pedigree	Class	PPO	Single kernel hardness	Wheat Protein, % (12% m.b.)	Flour Yield, %	Flour Protein, % (14% m.b.)	Color			Wheat Ash, %	Flour Ash, %	Mixograph Type	Mixing Tolerance	Mixo Mixing Time, min	Mixo Water Absorption, %	Bake Mixing Time, min	Bake Water Absorption, %	Loaf Volume	Crumb Grain Score
									L* Brightness	a* Green - Red	b* Blue - Yellow										
1	Rampart	check	HRW		92.3	13.1	65.6	11.7	90.5	-1.66	11.7	1.54	0.42	M	4	5.4	63.5	12.8	73.2	1075	
2	Genou	check	HRW		88.9	10.6	63.7	9.7	90.8	-1.51	10.3	1.53	0.42	LM	4	6.8	60.4	13.9	70.1	905	
3	CDC Falcon	check	HRW		72.6	10.8	62	9.3	91.2	-1.20	9.2	1.41	0.42	LM	3	7	59	12.8	69.2	905	
4	Yellowstone	check	HRW		79.5	10.2	67.1	8.8	90.6	-1.28	10.4	1.39	0.41	LM	4	7.7	57.8	12.9	69.0	870	
5	Judee	93X312E14/NuHorizon	HRW		76.5	12.1	65.5	10.7	90.4	-1.37	10.9	1.45	0.41	M	4	6.3	62	9.8	72.2	1055	
6	Bearpaw	DMS/Rampart//Pronghorn/3/2*Ram	HRW		90.3	11.2	66.5	9.9	90.1	-1.46	10.6	1.35	0.42	M	3	5.5	59.7	6.9	71.4	910	
7	MTS0808	MT9908//Nuplains/MTS9862	HRW		86.5	10.0	65.0	9.0	90.3	-1.59	11.1	1.37	0.42	M	4	5.1	59.0	6.9	69.2	930	
8	MTS0819	93X312E14/NuHorizon	HRW		87.9	10.5	64.5	9.1	90.3	-1.76	12.0	1.41	0.40	LM	3	7	59.4	10.4	70.1	900	
9	MTS0826	MT9524/G15048//Rampart	HRW		79.5	11.9	66.3	10.4	90.6	-1.83	11.8	1.48	0.41	MH	5	6.6	61.5	17.8	71.2	1005	
10	MTS0832	92X73E70/MTW9911	HRW		91.2	10.6	63.5	9.5	90.7	-1.65	11.1	1.36	0.41	LM	4	7.8	60.3	12.4	71.0	950	
11	MTCL1003	Jerry/CDC Teal 11A//MTCL0325	HRW		85.2	10.7	66.6	10.0	91.0	-1.50	10.7	1.41	0.41	LM	3	4.3	61.2	7.2	71.4	1000	
12	MTS1011	MTS0122//Genou/MTsw0101	HRW		73.3	9.3	65.1	8.2	91.3	-1.06	8.5	1.39	0.41	LM	5	5.5	54.3	13.6	70.5	805	
13	MTS1014	Genou/MTsw0102//93X269E79-1	HRW		82.6	10.1	68.8	9.0	90.8	-1.27	10.2	1.51	0.42	LM	3	7.2	58.2	14.9	70.4	860	
14	MTS1019	MT0192//NE98632/Genou	HRW		78.2	11.9	58.4	9.9	91.0	-1.41	10.1	1.46	0.44	M	4	5.5	59.8	8.1	70	940	
15	MTS1020	MTW01133//NW97S154/MTS0019	HWW		84.6	11.7	61.6	10.2	90.7	-1.56	11.0	1.50	0.43	M	4	5.1	61.4	7.8	72.1	975	
16	MTS1021	MTW01133//NW97S154/MTS0019	HRW		83.0	10.4	62.7	9.4	90.7	-1.67	11.2	1.45	0.43	LM	5	4.4	59.5	8.4	70.2	905	
17	MTS1024	MT02113*4/MTS0359	HRW		82.0	10.0	63.6	8.8	90.7	-1.52	11.2	1.51	0.42	M	5	7.2	58.9	13.3	71.1	955	
18	MTS1025	MTS0126//NuSky/ID551	HRW		78.0	11.9	65.4	10.4	90.8	-2.07	13.1	1.46	0.39	M	6	6.4	62	13.1	73.2	1085	
19	MTS1026	MTS0205/MT01134	HRW		80.4	10.5	68.5	9.3	90.3	-1.40	11.4	1.46	0.41	LM	4	4	59.7	5.2	69.9	910	
20	MTS1027	93X512cE61-1/MT0281	HRW		85.7	11.0	62.7	9.7	90.6	-1.73	11.9	1.53	0.44	LM	3	3.9	60.2	8.1	71.4	945	
21	MTS1028	MTW01133*2//MT02113/MTS0359	HRW		80.2	11.3	64.2	9.9	91.3	-2.00	12.4	1.41	0.41	M	4	5.1	60.4	7.6	71.1	970	
MIN					72.6	9.3	58.4	8.2	90.1	-2.07	8.5	1.35	0.39		3	3.9	54.3	5.2	69.0	805	
MAX					92.3	13.1	68.8	11.7	91.3	-1.06	13.1	1.54	0.44		6	7.8	63.5	17.8	73.2	1085	
AVE					82.8	10.9	64.6	9.7	90.7	-1.55	11.0	1.45	0.42		4.0	5.9	59.9	10.7	70.9	945	

Table 23. 2010 Sawfly Winter Wheat Nursery Mill & Bake (Exp. 5852)

Location: North Havre, MT

Sample No. x = lines in 2012 tests	Variety	Pedigree	Class	PPO	Single kernel hardness	Wheat Protein, % (12% m.b.)	Flour Yield, %	Flour Protein, % (14% m.b.)	Color			Wheat Ash, %	Flour Ash, %	Mixograph Type	Mixing Tolerance	Mixo Mixing Time, min	Mixo Water Absorption, %	Bake Mixing Time, min	Bake Water Absorption, %	Loaf Volume	Crumb Grain Score
									L* Brightness	a* Green - Red	b* Blue - Yellow										
1	Rampart	check	HRW		54.6	10.8	67.2	9.1	90.4	-2.00	10.3	1.25	0.39	LM	4	7.9	59.1	8	70.8	970	
2	Genou	check	HRW		48.0	10.1	65	8.3	91.8	-1.76	8.9	1.22	0.38	LM	5	6.6	55	12.1	66.7	945	
3	CDC Falcon	check	HRW		32.8	9.7	62.2	7.6	91.5	-1.96	10.3	1.18	0.37	L	4	7.2	52.2	14.3	66.9	920	
4	Yellowstone	check	HRW		44.2	9.6	67.2	7.6	91.5	-1.52	8.8	1.25	0.37	LM	6	6.3	53.2	17.7	66.9	850	
5	Judee	93X312E14/NuHorizon	HRW		49.8	10.0	63.2	8.2	90.1	-1.84	9.9	1.33	0.38	LM	4	5.2	51.9	10.5	62.6	905	
6	Bearpaw	DMS/Rampart//Pronghorn/3/2*Ram	HRW		57.2	10.2	66.2	8.6	91.8	-1.75	8.9	1.28	0.37	LM	4	4.6	53.1	8.2	66.8	905	
7	MTS0808	MT9908//Nuplains/MTS9862	HRW		53.3	10.5	66.7	8.7	91.6	-1.72	9.5	1.23	0.38	LM	5	5.1	53.0	10.8	68.7	905	
8	MTS0819	93X312E14/NuHorizon	HRW		51.2	10.1	64.7	8.2	91.6	-1.96	10.3	1.24	0.36	LM	5	5.7	53.6	13	66.8	925	
9	MTS0826	MT9524/G15048//Rampart	HRW		47.3	10.2	65.3	8.5	91.5	-2.19	10.6	1.22	0.36	LM	3	8.3	55.8	17.1	71.0	910	
10	MTS0832	92X73E70/MTW9911	HRW		57.6	11.2	64.4	9.4	91.4	-2.00	10.7	1.29	0.39	LM	4	9	56.4	10.6	67.6	1125	
11	MTCL1003	Jerry/CDC Teal 11A//MTCL0325	HRW		51.9	10.6	66.9	8.9	91.4	-1.76	9.4	1.14	0.35	LM	3	6.8	55.3	6.3	66	975	
12	MTS1011	MTS0122//Genou/MTsw0101	HRW		38.6	9.6	66.1	8.0	91.5	-1.38	7.5	1.14	0.36	LM	4	6	55.8	13.3	68	870	
13	MTS1014	Genou/MTsw0102//93X269E79-1	HRW		45.2	10.3	67.4	8.5	91.3	-1.69	9.5	1.29	0.38	LM	5	7.3	55.5	14.6	67.7	950	
14	MTS1019	MT0192//NE98632/Genou	HRW		37.7	10.4	59.3	8.4	92.1	-1.69	8.5	1.32	0.39	LM	3	6.4	55.2	8.9	65.9	950	
15	MTS1020	MTW01133//NW97S154/MTS0019	HWW		55.1	10.3	61.8	8.2	90.6	-1.74	9.2	1.30	0.40	LM	2	6.3	54.7	8.0	65.9	905	
16	MTS1021	MTW01133//NW97S154/MTS0019	HRW		59.3	10.5	63.4	9.1	90.9	-1.80	10.0	1.23	0.39	LM	3	6.2	58.1	9.2	67.8	965	
17	MTS1024	MT02113*4/MTS0359	HRW		41.1	9.7	62.8	8.2	91.0	-1.82	10.1	1.25	0.37	LM	5	9.3	54.6	13.3	66.8	960	
18	MTS1025	MTS0126//NuSky/ID551	HRW		47.4	10.0	64.5	8.0	92.0	-2.41	11.5	1.29	0.36	LM	4	7.9	54.4	13.8	65.6	990	
19	MTS1026	MTS0205/MT01134	HRW		52.1	10.6	68.3	8.8	90.7	-1.78	10.4	1.27	0.39	LM	4	5.3	56	6.6	65.7	1010	
20	MTS1027	93X512cE61-1/MT0281	HRW		47.3	9.3	65.9	7.7	91.1	-1.87	10.0	1.24	0.38	LM	3	4.8	53.2	8.8	66.9	890	
21	MTS1028	MTW01133*2//MT02113/MTS0359	HRW		53.0	10.3	64.4	8.6	91.4	-2.15	10.8	1.22	0.38	LM	4	6.4	54.6	9.4	65.8	940	
MIN					32.8	9.3	59.3	7.6	90.1	-2.41	7.5	1.14	0.35		2	4.6	51.9	6.3	62.6	850	
MAX					59.3	11.2	68.3	9.4	92.1	-1.38	11.5	1.33	0.40		6	9.3	59.1	17.7	71.0	1125	
AVE					48.8	10.2	64.9	8.4	91.3	-1.85	9.8	1.25	0.38		4.0	6.6	54.8	11.2	67.0	941	

Table 24. 2010 Sawfly Winter Wheat Nursery Mill & Bake (Exp. 58)

Location: Means Across Locations

Sample No. x = lines in 2012 tests			Class	PPO	Single kernel hardness	Wheat Protein, % (12% <i>m.b.</i>)	Flour Yield, %	Flour Protein, % (14% <i>m.b.</i>)				Wheat Ash, %	Flour Ash, %	Mixing Tolerance	Mixo Mixing Time, min	Mixo Water Absorption, %	Bake Mixing Time, min	Bake Water Absorption, %	Loaf Volume
	Variety	Pedigree							L* Brightness	a* Green - Red	b* Blue - Yellow								
1	Rampart	check	HRW		69.2	13.1**	68.4*	11.4**	90.4	-1.71	11.0	1.45	0.40	3.3	6.6	64.5**	13.8	74.5	1045*
2	Genou	check	HRW		67.0	11.8	66.9	10.4	91.1	-1.53	9.6	1.42	0.40	4.0	6.4	61.3	14.8	71.5	1000*
3	CDC Falcon	check	HRW		55.1	11.6	63.7	9.7	91.0	-1.38	9.5	1.40	0.40	3.7	6.4	59.0	12.2	70.5	958
4	Yellowstone	check	HRW		61.4	11.1	68.3*	9.4	90.7	-1.28	9.6	1.42	0.40	5.0	7.0	59.1	14.7	70.8	948
5	Judee	93X312E14/NuHorizon	HRW		64.4	12.2*	66.0	10.5	90.2	-1.51	10.4	1.49	0.40	4.0	5.9	60.2	10.5	70.4	1067*
6	Bearpaw	DMS/Rampart//Pronghorn/3/2*Ram	HRW		71.7	12.1	67.6*	10.4	90.8	-1.49	9.7	1.41	0.39	3.0	4.8	59.9	7.6	71.6	972
7	MTS0808	MT9908//Nuplains/MTS9862	HRW		72.3	11.8	67.4*	10.3	90.6	-1.51	10.3	1.39	0.41	3.7	4.8	59.8	8.5	71.3	983
8	MTS0819	93X312E14/NuHorizon	HRW		72.3	11.6	65.1	9.9	90.7	-1.79	11.2	1.44	0.38*	3.7	6.6	60.3	11.4	72.1	1003*
9	MTS0826	MT9524/G15048//Rampart	HRW		62.5	12.4*	67.6*	10.7*	90.9	-1.93	11.3	1.45	0.39*	3.3	7.3	62.3	18.5	73.6	1040*
10	MTS0832	92X73E70/MTW9911	HRW		74.6	11.8	65.8	10.3	90.9	-1.77	11.0	1.39	0.39	4.3	7.9	61.7	12.8	72.1	1082**
11	MTCL1003	Jerry/CDC Teal 11A//MTCL0325	HRW		66.1	11.9	68.3*	10.5	90.9	-1.53	10.1	1.37	0.38*	2.7	5.2	61.3	7.6	71.3	1060*
12	MTS1011	MTS0122//Genou/MTsw0101	HRW		55.7	10.8	68.0*	9.3	91.0	-1.11	8.1	1.35	0.39*	4.0	6.4	58.8	16.9	71.6	898
13	MTS1014	Genou/MTsw0102//93X269E79-1	HRW		63.6	11.3	69.3*	9.8	90.7	-1.38	9.9	1.49	0.40	3.7	6.9	60.0	14.4	71.8	955
14	MTS1019	MT0192//NE98632/Genou	HRW		57.8	11.9	61.2	9.9	91.4	-1.50	9.3	1.42	0.41	3.3	5.6	60.1	9.6	70.5	985
15	MTS1020	MTW01133//NW97S154/MTS0019	HRW		71.7	11.9	62.6	10.0	90.6	-1.61	10.3	1.51	0.41	4.0	6.1	61.4	9.3	72.3	993
16	MTS1021	MTW01133//NW97S154/MTS0019	HRW		70.1	11.5	63.7	10.1	90.6	-1.63	10.7	1.48	0.41	4.3	6.0	61.8	10.3	71.9	1028*
17	MTS1024	MT02113*4/MTS0359	HRW		62.3	10.9	64.7	9.4	90.7	-1.52	10.5	1.46	0.40	4.7	7.5	59.9	13.3	72.1	1017*
18	MTS1025	MTS0126//NuSky/ID551	HRW		61.6	11.8	67.0	10.0	91.0	-2.14	12.4	1.46	0.37**	4.7	6.4	61.0	12.6	71.7	1067*
19	MTS1026	MTS0205/MT01134	HRW		62.9	11.7	68.9*	9.9	90.5	-1.49	10.8	1.46	0.40	3.7	4.5	61.3	6.7	70.8	1015*
20	MTS1027	93X512cE61-1/MT0281	HRW		68.1	11.2	65.6	9.6	90.6	-1.70	10.9	1.47	0.41	3.3	4.4	59.7	8.2	71.2	983
21	MTS1028	MTW01133*2//MT02113/MTS0359	HRW		66.1	11.9	65.3	10.3	91.2	-1.99	11.7	1.43	0.40	4.7	6.7	61.2	10.2	71.8	1025*
Average					65.6	11.7	66.3	10.1	90.8	-1.60	10.4	1.44	0.40	3.9	6.2	60.7	11.6	71.7	1006
LSD (0.05)					6.8	1.0	2.0	0.9	0.5	0.15	0.6	ns	0.02	ns	1.7	2.2	4.0	ns	86
C.V.					1.3	5.0	1.8	5.3	0.4	5.9	3.7	3.8	2.4	27.0	16.3	2.2	20.8	1.8	5.2
P-Value					<.0001	0.0111	<.0001	0.0049	0.0102	<.0001	<.0001	0.0750	0.0003	0.4827	0.0029	0.0015	<.0001	0.0737	0.0103