A motion to release MT1316 hard red spring wheat as a public variety with PVP Title V protection.

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The rationale for release of MT1316 includes high yield potential in dryland locations throughout Montana. MT1316 has acceptable protein levels and very good bread-making qualities. MT1316 is a product of the cross 'Glenn' (Mergoum et al., 2006)/MT0747. Glenn was developed by North Dakota State University, and combined high yield potential with excellent end-use quality. MT0747 was the product of a cross between MT0223 and MT0266. Parents of MT 0223 were 'McNeal' and 'Reeder'. Parents of MT0266 were Reeder and experimental line MT9755. MT9755 descended from the cross MTRWA141/'Pondera'.

MT1316 showed high grain yield under rainfed conditions throughout Montana in 2014 and 2015 (Table 1) in the Advanced Yield Trial. Vida has been the most widely grown cultivar in Montana from 2010-2015, and MT1316 yielded similarly to Vida at all rainfed sites. Yield potential at irrigated sites in Sidney and the high moisture Kalispell locations were similar to the other cultivars. Mean values for other agronomic traits based on the 14 locations for the Advanced Yield Trial are shown in Table 2. MT1316 had test weight most similar to Choteau, grain protein 0.3% higher than Vida, and headed approximately 2.5 days earlier than Vida. Height of MT1316 was most similar to Choteau. MT1316 has hollow stems, suggesting that it will be susceptible to damage caused by the wheat stem sawfly. Data from the Preliminary Yield Trial grown in 2013 supports the AYT data from 2014 and 2015. MT1316 was most similar to Vida in terms of yield and test weight. MT 1316 headed earlier than Vida and was shorter. MT 1316 had grain protein levels approximately 0.7% higher than Vida.

MT1316 was also grown in three Preliminary Yield Trial sites in 2013 (Table 3). Data from these sites showed that grain yield of MT1316 was second only to Vida among the check varieties, though statistical differences for grain yield did not exist. MT1316 had grain protein approximately 0.7% higher than Vida in the Preliminary Yield Trial. Data form 20 off-station sites in 2015 showed that MT1316 yielded similarly to Vida in dryland conditions and grain protein was approximately 0.4% higher (Table 5). MT1316 was earlier to head than Vida. MT1316 did well under irrigation, though Duclair was superior in terms of yield potential.

Baking quality of MT1316 was tested from four nurseries in 2014 and three nurseries in 2015. In general, mixograph tolerance values and bake mix time values showed that MT1316 was stronger than Vida and Reeder, and weaker than McNeal and Egan. MT1316 is most similar to Duclair. Loaf volume for MT1316 tended to be higher than Vida and Reeder, and lower than McNeal and Egan.

Table 1. Grain yield (Bu/Ac) of MT1316 compared to other commonly grown cultivars in Montana. For combined analysis over 2014 and 2015, the number of entries common in both years and used in the analysis was 29. For sites where only one year was analyzed, the number of entries was 64. Underlined values indicates that the value was not significantly different than the highest-yielding line in the experiment.

Environment	Rain-fed							Irrigated			Total
Location	Bozeman	Conrad	Havre	Moccasin	Sidney	Huntley	Mean	Sidney	Kalispell	Mean	
Year	14-15	14-15	14-15	14-15	14	14	N=10	14-15	14-15	N=4	N=14
MT1316	**62.6**	**74.3**	**44.3**	**34.2**	**51.6**	**47.6**	**53.0**	**80.2**	**113.7**	**96.9**	**65.5**
REEDER	54.7	80.0	44.0	34.0	46.0	42.2	51.4	82.4	109.4	95.9	64.1
MCNEAL	52.8	75.5	42.5	35.7	42.8	39.6	49.5	80.6	110.8	95.7	62.7
CHOTEAU	54.5	61.7	39.9	31.7	39.2	39.6	45.4	80.6	109.9	95.2	59.6
VIDA	63.2	75.1	46.9	32.9	49.6	44.2	53..0	77.0	117.2	97.1	65.6
DUCLAIR	55.6	72.1	45.1	33.4	45.1	44.6	50.2	86.8	114.3	100.5	64.6
EGAN	47.6	67.1	38.4	33.1	33.7	45.0	45.1	76.7	112.6	94.6	59.2
Mean	56.8	72.4	42.0	33.6	41.3	41.2	49.4	78.9	109.9	94.4	62.2
Probability (Line)	<0.05	<0.05	<0.001	NS	<0.001	<0.001	<0.001	NS	<0.05	<.001	<0.01
LSD	11.0	13.0	4.7	-	7.5	6.9	5.9	-	14.2	9.9	7.4

Table 2. Agronomic characteristics of MT1316 compared to commonly grown cultivars in Montana from the Advanced Yield Trial grown in a total of 14 locations in 2014 and 2015. For combined analysis over 2014 and 2015, the number of entries common in both years and used in the analysis was 29. Underlined values indicates that the value was not significantly different than the highest-yielding line in the experiment.

Line / Variety	Test weight (Lb/Bu)	Grain Protein (%)	Heading Date (Julian)	Plant Height (Inches)	Solid Stem Score (5-25)
MT1316	**59.0**	**15.1**	**173.4**	**30.7**	**6.3**
REEDER	59.6	14.9	175.3	32.0	7.8
MCNEAL	58.5	14.9	176.7	31.9	7.8
CHOTEAU	58.7	15.2	174.9	30.1	18.0
VIDA	58.5	14.7	175.9	31.4	12.0
DUCLAIR	58.2	14.8	173.3	31.7	15.4
EGAN	58.3	16.6	176.5	30.9	8.0
Mean	58.9	15.1	174.6	31.4	11.3
Probability (Line)	<0.001	<0.001	<0.001	<0.001	<0.01
LSD	1.0	0.6	1.3	1.1	6.4

Table 3. Grain yield (Bu/Ac) in the Preliminary Yield Trial in 2013 of MT1316 compared to check varieties.

Line / Variety	Havre	Moccasin	Bozeman	Mean
MT1316	**64.9**	**48.4**	**45.0**	**52.8**
FORTUNA	47.6	40.2	47.9	45.2
MCNEAL	52.0	41.9	37.2	43.7
CHOTEAU	67.6	34.2	41.7	47.8
VIDA	73.6	40.9	50.4	55.0
DUCLAIR	68.2	37.8	44.9	50.3
MEAN	58.8	40.9	45.9	48.5
Prob. (LINE)	<0.001	<0.001	<0.01	NS
LSD(0.05)	7.7	6.6	10.0	-

Table 4. Agronomic data for MT1316 compared to checks from three dryland locations of the Preliminary Yield Trial in 2013.

Line / Variety	Test weight (Lb/Bu)	Grain Protein (%)	Heading Date (Julian)	Plant Height (Inches)
MT1316	**59.8**	**15.2**	**180.6**	**28.3**
Fortuna	60.8	15.0	181.8	36.0
McNeal	59.3	14.8	182.0	28.9
Choteau	60.0	15.0	181.2	28.3
Vida	59.7	14.5	182.4	29.8
Duclair	58.5	15.0	180.3	29.0
Mean (n=81)	59.9	15.1	180.7	29.3
Prob. (LINE)	<0.001	<0.001	<0.001	<0.001
LSD	1.3	0.7	0.9	1.7

Table 5. Agronomic performance of MT1316 in the 2015 Spring Wheat Off-Station Nursery grown in 16 environments, including 12 dryland sites and four irrigated sites.

	HEADING DATE (Julian)			**HEIGHT (Inches)**			**YIELD (Bu/Ac)**			**TEST WEIGHT (Lb/Bu)**			**GRAIN PROTEIN (%)**		
Line / Variety	DRY	IRRI	TOTAL	DRY	IRRI	TOTAL	DRY	IRRI	TOTAL	DRY	IRRI	TOTAL	DRY	IRRI	TOTAL
MT1316	**174.5**	**173.2**	**174.0**	**25.0**	**32.4**	**26.9**	**38.1**	**82.1**	**49.1**	**58.3**	**61.7**	**59.2**	**14.9**	**13.1**	**14.4**
FORTUNA	176.8	175.7	176.3	29.4	40.9	32.3	27.5	65.9	37.1	58.4	61.3	59.1	15.3	14.0	14.9
MCNEAL	176.2	175.9	176.1	26.3	35.1	28.5	34.5	70.6	43.5	57.6	60.9	58.4	15.3	13.6	14.9
REEDER	177.5	176.4	177.0	25.2	36.0	27.9	35.0	74.5	44.8	59.2	61.9	59.8	15.1	13.3	14.6
CHOTEAU	177.2	174.7	176.2	25.0	33.8	27.2	33.7	81.6	45.7	58.1	61.1	58.9	15.2	13.5	14.8
VIDA	177.8	176.2	177.1	26.2	35.4	28.5	36.8	80.4	47.7	58.5	60.6	59.0	14.5	13.2	14.2
DUCLAIR	176.0	172.7	174.6	26.3	34.6	28.4	35.4	88.6	48.7	57.0	61.1	58.1	14.9	12.8	14.4
Mean	176.9	175.0	176.1	25.4	34.2	27.6	34.5	78.6	45.5	58.6	61.4	59.3	15.1	13.2	14.6
Proba. (Line)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	<0.05	<0.001	<0.001	<0.001	<0.001
LSD	1.2	1.7	1	0.9	1.7	0.9	2.5	10	3.2	0.7	1.2	0.6	0.4	0.9	0.4
No. of environments	3	2	5	12	4	16	12	4	16	12	4	16	12	4	16

Table 6. End-use quality of MT1316 compared to other popular varieties in 2014 and 2015.

Line / Variety	Flour Yield (%)	Flour Protein (%, 14% m.b.)	Mixograph Tolerance	Bake Mix Time (min.)	Loaf Volume	Bake Water Absorption (%)
2014						
MT1316	**71.2**	**13.0**	**4.3**	**9.3**	**1216**	**75.2**
Fortuna	73.4	12.8	3.7	6.6	1118	72.8
McNeal	69.0	12.8	5.7	16.7	1185	77.4
Reeder	70.7	12.8	3.3	6.0	1128	73.9
Choteau	71.2	13.4	4.0	6.6	1166	74.9
Vida	73.0	12.1	3.3	6.6	1110	73.1
Duclair	71.0	12.5	4.7	8.8	1216	73.6
Egan	67.4	14.4	6.0	18.4	1330	78.8
Mean	70.9	13.0	4.1	10.0	1160	75.4
Prob. (line)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LSD	0.92	0.67	1.2	3.8	80.4	2.6
2015						
MT1316	**71.1**	**14.8**	**3.7**	**7.5**	**1280**	**78.0**
Fortuna	72.1	14.0	2.7	6.5	1160	76.1
McNeal	68.9	14.0	5.0	11.9	1288	78.9
Reeder	70.5	14.7	3.3	5.7	1193	76.9
Choteau	70.8	14.5	3.0	7.3	1205	77.7
Vida	71.5	14.4	2.7	6.0	1221	76.8
Duclair	70.0	14.1	4.3	7.9	1268	76.7
Egan	69.3	15.7	6.3	16.4	1366	84.0
Mean	70.8	14.1	3.6	8.8	1188	78.1
Prob. (line)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LSD	1.3	0.83	1.5	4.5	77.1	2.7