2008 VARIETAL RECOMMENDATION

Volt

(exp. # ACS 52610)

WestBred, LLC request that 'Volt' hard red spring wheat be considered for "Variety Recommendation in the State of Montana".

A motion that Volt be recommended as a hard red spring wheat for all Irrigated Districts in Montana.

Volt is a hard red spring wheat developed by Dr. Peter Franck with the plant breeding company, PZO Pflanzenzucht Oberlimpurg, in Germany. Application for PVP will be submitted.

Volt is being released as a high yielding, disease resistant variety for irrigated growing conditions. For the 3 year period 2005 - 2007, (29 locations), the average per acre yield of Volt in the MSU Intrastate Trials is 58.1 bushels, compared to Hank at 56.1 bushels and Choteau at 53.9 bushels. The average test weight has been 60.6 lbs, which is 3.5 pounds heavier than Hank and 1.3 lbs heavier than Choteau. Protein levels have averaged 13.7%, which is .5 -.6 percentage points lower than Hank or Choteau. The average plant height of Volt is 31 inches, which is similar to Hank and Choteau. The average heading date of Volt is four days later than Hank and two days later than Choteau. See Table 1 for a summary of combined location/years averages, and Tables 2 through 11 for individual location/years averages.

Milling and baking quality data from the 2005-2006 crops indicate that Volt has slightly lower loaf volume, but in general, has acceptable quality when grown in Montana (Tables 14 and 15).

Disease/sawfly ratings for Volt show it to have very good tolerance to stripe rust (Table 13.) and fusarium head blight (Table 16). Volt is susceptible to damage from the wheat stem sawfly (Table 12.).

Table 1 . 2005-2007 Spring Wheat Combined Locations Yield, Test Weight and Protein

29 location years

Cultivar/Line	Yield bu/ac 2005-2007			TW lbs/bu	Protein %	Heading Date	Plant Ht.
	Irrigated	Dryland	All Locations	2005-2007	2005-2007	2005-2007	2005-2007
location-years	11	18	29	29	29	29	29
MCNEAL	59.6	44.9	50.4	57.9	14.3	175	33
REEDER	69.8	47.9	56.2	59.9	14.5	173	33
HANK	70.2	47.5	56.1	57.1	14.2	172	31
CHOTEAU	65.7	46.7	53.9	59.3	14.3	174	31
VOLT	**76.0**	**47.1**	**58.1**	**60.6**	**13.7**	**176**	**31**
ONEAL (BZ999-592)	**67.6**	**47.7**	**55.2**	**58.8**	**14.2**	**175**	**33**
JEDD	**68.6**	**48.3**	**56.0**	**60.1**	**13.9**	**172**	**28**
AVG	66.2	46.2	55.1	59.1	14.2	174	31

Table 2 . 2005-2007 Bozeman Irrigated Spring Wheat: Yield, Test Weight, Protein, Heading Dateand Plt.Ht

3 location years

Cultivar/Line	Yield bu/ac	TW lbs/bu	Protein %	Heading Date	Plant Ht.
	2005-2007	2005-2007	2005-2007	2005-2007	2005-2007
location-years					
MCNEAL	52.3	58.1	15.0	182	35
REEDER	65.6	60.5	15.2	180	35
HANK	69.6	56.7	14.9	179	32
CHOTEAU	65.4	58.8	15.3	180	33
VOLT	**76.3**	**61.3**	**14.2**	**183**	**33**
ONEAL (BZ999-592)	**64.9**	**58.6**	**14.8**	**182**	**35**
JEDD	**69.9**	**60.8**	**14.4**	**179**	**29**
AVG	66.3	59.3	14.8	181	33

Table 3 . 2005-2007 Bozeman Dry Spring Wheat:Yield, Test Weight, Protein, Heading Date and Plt. Ht.

3 location years

Cultivar/Line	Yield bu/ac	TW lbs/bu	Protein %	Heading Date	Plant Ht.
	2005-2007	2005-2007	2005-2007	2005-2007	2005-2007
MCNEAL	48.8	57.0	15.0	182	32
REEDER	57.5	60.1	15.3	179	34
HANK	56.3	56.0	15.4	179	30
CHOTEAU	51.9	57.8	15.6	180	31
VOLT	**56.2**	**58.4**	**15.5**	**183**	**31**
ONEAL (BZ999-592)	**57.1**	**58.3**	**15.3**	**182**	**32**
JEDD	**55.3**	**59.3**	**14.6**	**178**	**27**
AVG	54.7	58.1	15.2	180	31

Table 4 . 2005-2007 Sidney Dry Spring Wheat: Yield, Test Weight,Protein, Heading Date and Plt. Ht.

3 location years

Cultivar/Line	Yield bu/ac	TW lbs/bu	Protein %	Heading Date	Plant Ht.
	2005-2007	2005-2007	2005-2007	2005-2007	2005-2007
MCNEAL	50.7	59.7	12.9	171	30
REEDER	54.0	61.5	13.1	169	30
HANK	52.2	59.7	11.8	168	27
CHOTEAU	50.2	61.4	12.8	170	28
VOLT	**51.3**	**62.1**	**11.4**	**172**	**28**
ONEAL (BZ999-592)	**51.6**	**60.3**	**12.1**	**171**	**29**
JEDD	**53.2**	**62.1**	**12.0**	**167**	**25**
AVG	51.9	61.0	12.3	170	28

Table 5 . 2005-2007 Sidney Irrigated Spring Wheat: Yield, Test Weight, Protein, Heading Date and Plt. Ht.

3 location years

Cultivar/Line	Yield bu/ac	TW lbs/bu	Protein %	Heading Date	Plant Ht.
	2005-2007	2005-2007	2005-2007	2005-2007	2005-2007
MCNEAL	61.1	59.1	13.5	174	33
REEDER	63.5	61.2	14.0	172	32
HANK	61.4	58.7	13.8	171	29
CHOTEAU	54.2	60.1	13.7	172	29
VOLT	**61.7**	**60.3**	**13.1**	**176**	**30**
ONEAL (BZ999-592)	**62.4**	**58.9**	**13.6**	**174**	**34**
JEDD	**59.6**	**60.5**	**13.5**	**171**	**26**
AVG	60.6	59.8	13.6	173	30

Table 6. 2005-2007 Kalispell Spring Wheat: Yield, Test Weight, Protein, Heading Date and Plt. Ht.

3 location years

Cultivar/Line	Yield bu/ac	TW lbs/bu	Protein %	Heading Date	Plant Ht.
	2005-2007	2005-2007	2005-2007	2005-2007	2005-2007
MCNEAL	49.3	55.5	15.3	177	34
REEDER	76.7	58.9	15.4	174	36
HANK	67.1	55.8	15.0	174	33
CHOTEAU	64.3	59.3	15.4	175	33
VOLT	**79.8**	**61.3**	**13.6**	**178**	**33**
ONEAL (BZ999-592)	**59.5**	**57.9**	**15.2**	**177**	**34**
JEDD	**60.2**	**59.7**	**14.5**	**174**	**29**
AVG	65.3	58.3	14.9	176	33

Table 7 . 2005-2007 Moccasin Spring Wheat: Yield, Test Weight, Protein, Heading Date and Plt. Ht.

3 location years

Cultivar/Line	Yield bu/ac	TW lbs/bu	Protein %	Heading Date	Plant Ht.
	2005-2007	2005-2007	2005-2007	2005-2007	2005-2007
MCNEAL	33.8	56.6	14.9	179	34
REEDER	34.6	58.2	14.7	177	34
HANK	36.2	54.1	14.1	176	32
CHOTEAU	34.6	58.6	13.6	177	33
VOLT	**34.7**	**60.1**	**13.0**	**179**	**32**
ONEAL (BZ999-592)	**32.9**	**57.6**	**14.8**	**178**	**34**
JEDD	**37.4**	**58.0**	**14.8**	**176**	**29**
AVG	34.9	57.6	14.3	177	33

Table 8. 2005-2007 Huntley Dry Spring Wheat: Yield, Test Weight, Protein, Heading Date and Plt. Ht.

3 location years

Cultivar/Line	Yield bu/ac	TW lbs/bu	Protein %	Heading Date	Plant Ht.
	2005-2007	2005-2007	2005-2007	2005-2007	2005-2007
MCNEAL	50.7	59.2	13.1	164	36
REEDER	52.4	60.5	13.2	162	35
HANK	51.0	58.7	12.5	162	32
CHOTEAU	50.1	59.7	13.2	163	33
VOLT	**53.9**	**60.7**	**12.7**	**164**	**33**
ONEAL (BZ999-592)	**51.9**	**59.9**	**12.4**	**164**	**35**
JEDD	**50.0**	**60.2**	**12.6**	**163**	**30**
AVG	51.4	59.8	12.8	163	33

Table 9. 2005-2007 Huntley Irrigated Spring Wheat : Yield, Test Weight, Protein, Heading Date and Plt. Ht.

3 location years

Cultivar/Line	Yield bu/ac	TW lbs/bu	Protein %	Heading Date	Plant Ht.
	2005-2007	2005-2007	2005-2007	2005-2007	2005-2007
MCNEAL	83.6	62.9	11.8	164	41
REEDER	75.0	63.0	12.4	162	43
HANK	89.0	61.2	12.2	163	37
CHOTEAU	85.4	62.4	12.1	164	38
VOLT	**91.2**	**63.6**	**12.1**	**164**	**36**
ONEAL (BZ999-592)	**91.4**	**63.1**	**11.7**	**164**	**41**
JEDD	**92.7**	**63.2**	**12.1**	**163**	**34**
AVG	86.9	62.8	12.1	163	39

Table 10. 2005-2007 Conrad Spring Wheat: Yield, Test Weight, Protein, Heading Date and Plt. Ht.

3 location years

Cultivar/Line	Yield bu/ac	TW lbs/bu	Protein %	Heading Date	Plant Ht.
	2005-2007	2005-2007	2005-2007	2005-2007	2005-2007
MCNEAL	47.4	58.3	14.4	180	31
REEDER	50.1	59.4	14.8	179	32
HANK	47.9	56.9	15.1	178	31
CHOTEAU	51.9	59.5	14.7	180	30
VOLT	**48.1**	**61.2**	**14.6**	**182**	**30**
ONEAL (BZ999-592)	**51.4**	**58.6**	**15.1**	**181**	**32**
JEDD	**51.6**	**60.4**	**14.1**	**179**	**27**
AVG	49.8	59.2	14.7	180	30

Table 11. 2005-2007 Havre Spring Wheat: Yield, Test Weight,Protein, Heading Date and Plt. Ht.

3 location years

Cultivar/Line	Yield bu/ac	TW lbs/bu	Protein %	Heading Date	Plant Ht.
	2005-2007	2005-2007	2005-2007	2005-2007	2005-2007
MCNEAL	37.8	54.7	16.5	175	26
REEDER	38.5	56.3	15.8	173	28
HANK	41.1	54.4	16.3	171	26
CHOTEAU	41.3	55.8	15.9	173	26
VOLT	**38.5**	**57.8**	**15.7**	**176**	**26**
ONEAL (BZ999-592)	**41.0**	**56.3**	**16.5**	**174**	**25**
JEDD	**42.1**	**57.9**	**15.6**	**171**	**23**
AVG	40.0	56.2	16.0	173	26

Table 12. 2006, 2007 Bozeman Solid Stem Score and Havre Saw Fly Cutting

Cultivar/Line	Bozeman Solid Stem Score		Havre Saw Fly Cutting%	
	2006	2007	2006	2007
MCNEAL	6.8	7.4	14.5	15.5
REEDER	6.2	7.3	7.6	13.3
HANK	7.3	8.9	9.8	9.4
CHOTEAU	20.9	24.6	0.8	2.6
VOLT	**6.9**	**8.5**	**17.3**	**12.9**
ONEAL (BZ999-592)	**6.5**	**7.8**	**5.3**	**4.7**
JEDD	**8.1**	**7.8**	**5.9**	**6.4**

Table 13. 2006 Stripe rust rating Bozeman and Kalispell

	Stripe Rust %	
VARIETY	Bozeman	Kalispell
MCNEAL	86.7	82.7
Reeder	43.3	13.6
HANK	60.0	72.3
CHOTEAU	43.3	13.2
VOLT	**0.0**	**4.8**
ONEAL	**43.3**	**74.2**
JEDD	**31.7**	**57.6**

Table 14. 2005 Advanced Spring Wheat Yield Trial Mill & Bake
Location: Means Across Locations (Bozeman, Havre, Sidney dryland, Moccasin)

			Whole Grain Analysis			Flour Analysis			Mixograph Analysis				Bake Analysis		
Identity	Pedigree	Class	Wheat Protein, % (12%m.b.)	Single Kernal Hardness	Flour Yield, %	Flour Protein, % (14%m.b.)	Flour Ash, %	Wheat Ash, %	Mixograph Type	Mixing Tolerance	Mixo Mixing Time, min	Mixo Water Absorption, %	Bake Mixing Time, min	Bake Water Absorption, %	Loaf Volume	Crumb Grain Score
PI574642	MCNEAL	HRS	15.0	90.6	65.1	13.7	0.44	1.82	6.0	6.2	64.9	10.0	77.0	1220	3.3	
ND 695	Reeder	HRS	14.6	80.1	67.0	13.8	0.39	1.64	3.5	3.3	61.6	4.1	71.7	1119	3.5	
BZ992322	HANK	HRS	14.1	71.2	66.7	13.3	0.43	1.80	4.8	6.2	63.3	9.5	74.7	1178	3.5	
PI633974	CHOTEAU	HRS	13.7	74.3	67.0	13.0	0.37	1.60	4.5	3.6	63.2	5.6	73.2	1155	3.8	
ACS52610	**VOLT**	**HRS**	**13.2**	**92.7**	**66.1**	**12.0**	**0.44**	**1.61**	**6.3**	**6.0**	**62.6**	**13.6**	**77.2**	**1065**	**3.5**	
BZ999592	**ONEAL**	**HRS**	**14.7**	**91.9**	**66.8**	**13.3**	**0.44**	**1.74**	**5.3**	**6.7**	**64.2**	**12.1**	**78.2**	**1178**	**4.0**	
BZ9M1044	**JEDD**	**HRS**	**14.4**	**89.5**	**67.0**	**13.4**	**0.48**	**1.75**	**5.0**	**5.0**	**64.0**	**7.8**	**74.2**	**1171**	**3.8**	
Means Across Locations		*MIN*	***12.9***	***63.8***	***60.7***	***11.9***	***0.36***	***1.55***	***2.0***	***2.2***	***60.6***	***2.7***	***71.0***	***958***	***2.5***	
Means Across Locations		*MAX*	***15.0***	***99.8***	***70.7***	***13.9***	***0.51***	***1.85***	***6.5***	***8.1***	***66.8***	***22.3***	***81.7***	***1278***	***4.0***	
Means Across Locations		*AVE*	***14.1***	***81.2***	***67.7***	***13.1***	***0.42***	***1.68***	***4.4***	***4.6***	***63.3***	***8.1***	***74.2***	***1138***	***3.7***	

Table 15. 2006 Advanced Spring Wheat Yield Trial Mill & Bake
Location: Means Across Locations (Bozeman, Havre, Sidney (3103), Moccasin)

			Whole Grain Analysis			**Flour Analysis**			**Mixograph Analysis**				**Bake Analysis**			
Identity	**Pedigree**	**Class**	**Wheat Protein, % (12%m.b.)**	**Single Kernel Hardness**	**Flour Yield, %**	**Flour Protein, % (14%m.b.)**	**Flour Ash, %**	**Wheat Ash, %**	**Mixograph Type**	**Mixing Tolerance**	**Mixo Mixing Time, min**	**Mixo Water Absorption, %**	**Bake Mixing Time, min**	**Bake Water Absorption, %**	**Loaf Volume**	**Crumb Grain Score**
PI574642	MCNEAL	HRS	15.09	92.38	63.95	13.33	0.49	1.75	5.75	6.08	64.40	9.53	76.35	1208	4.00	
ND 695	Reeder	HRS	14.77	80.68	65.33	13.20	0.42	1.59	3.50	3.80	62.95	5.05	73.03	1148	3.50	
BZ992322	HANK	HRS	14.79	73.93	66.45	13.65	0.46	1.68	4.25	6.70	64.15	9.68	74.60	1174	3.75	
PI633974	CHOTEAU	HRS	15.00	74.78	65.75	13.58	0.42	1.60	3.75	3.80	63.83	5.18	73.15	1191	3.50	
ACS52610	**VOLT**	**HRS**	**13.93**	**89.98**	**66.30**	**12.33**	**0.48**	**1.62**	**5.00**	**5.88**	**62.78**	**10.43**	**75.73**	**995**	**4.00**	
BZ999592	**ONEAL**	**HRS**	**14.90**	**92.03**	**65.75**	**13.30**	**0.46**	**1.74**	**5.50**	**6.40**	**64.13**	**12.38**	**77.33**	**1170**	**4.00**	
BZ9M1044	**JEDD**	**HRS**	**14.72**	**90.05**	**66.28**	**13.23**	**0.49**	**1.67**	**4.50**	**4.98**	**64.13**	**8.00**	**74.70**	**1151**	**3.75**	
	NURSERY MIN		***13.6***	***71.6***	***62.6***	***12.1***	***0.39***	***1.49***	***2.0***	***2.1***	***61.2***	***3.0***	***71.4***	***995***	***2.5***	
	NURSERY MAX		***15.7***	***99.3***	***69.1***	***14.0***	***0.51***	***1.80***	***6.0***	***7.0***	***67.6***	***15.6***	***79.6***	***1238***	***4.0***	
	NURSERY AVE		***14.7***	***83.9***	***66.3***	***13.1***	***0.45***	***1.65***	***4.3***	***4.7***	***63.8***	***7.7***	***74.2***	***1139***	***3.6***	

Table 16. Effects of Fusarium Head Blight on Spring Wheat Varieties in 2006 and 2007.

VARIETY	FHB reaction	Grain Yield 2007	Grain Yield 2006	**Grain Yield 2 yr Aver**	Test Wt 2007	Test Wt 2006	**Test Wt 2 yr Aver**	DON <0.20 2007	DON <0.20 2006	**DON <0.20 2 yr Aver**	Scab Heads Aug 08, 2007	Scab Heads Aug 06, 2006	**Scab Heads 2 yr Aver**
		Bu/ac	Bu/ac	**Bu/ac**	Lb/bu	Lb/bu	**Lb/bu**	ppm	ppm	**ppm**	%	%	**%**
VOLT	Tolerant	88.4	86.7	**87.4**	63.3	61.6	**62.3**	1.0	0.00	**0.43**	9.3	3.8	**6.2**
FREYR	Sumai3	90.1	85.0	**87.2**	62.4	60.6	**61.4**	0.50	0.06	**0.25**	6.8	10.7	**9.0**
KUNTZ	Sumai3	81.2	90.5	**86.5**	62.2	60.4	**61.2**	0.83	0.00	**0.36**	16.0	12.4	**13.9**
KNUDSON	Sumai3	86.8	80.7	**83.3**	61.3	59.2	**60.1**	0.63	0.15	**0.36**	5.1	6.1	**8.1**
MT0550	Sumai3	88.8	78.9	**83.1**	63.1	60.7	**61.8**	0.37	0.16	**0.25**	1.8	7.7	**5.2**
KELBY	Sumai3	83.0	78.5	**80.5**	62.8	60.7	**61.6**	0.50	0.25	**0.36**	15.7	16.0	**15.9**
CHOTEAU		77.9	na	**77.9**	60.8	na	**60.8**	2.83	na	**2.83**	21.5	na	**21.5**
EXPRESSO		77.4	76.0	**76.6**	60.6	59.2	**59.8**	5.07	1.98	**3.30**	18.0	33.5	**26.8**
GRANITE	Tolerant	75.5	74.5	**74.9**	62.8	61.8	**62.2**	0.73	0.11	**0.38**	5.6	26.8	**7.0**
ALSEN	Sumai3	74.4	67.7	**70.6**	63.1	61.2	**62.0**	0.27	0.00	**0.11**	3.4	8.1	**6.3**
GLENN	Sumai3	74.1	67.3	**70.2**	64.7	63.1	**63.8**	0.33	0.00	**0.14**	1.3	4.9	**3.3**
VIDA		71.4	68.2	**69.5**	58.5	56.9	**57.6**	1.13	1.61	**1.41**	6.8	29.3	**19.7**
MT0551		na	66.8	**66.8**	na	59.9	**59.9**	na	1.33	**1.33**	na	12.9	**12.9**
HOWARD		62.2	68.9	**66.0**	60.7	59.6	**60.1**	1.33	0.89	**1.08**	16.3	26.8	**22.3**
HANK B		65.5	53.0	**58.4**	56.3	52.1	**53.9**	6.70	9.40	**8.24**	39.3	67.5	**51.8**
HANK A		60.5	52.9	**56.1**	55.3	51.7	**53.2**	7.90	10.3	**9.28**	32.5	66.4	**55.4**
EXPLORER		45.4	61.0	**54.3**	54.2	56.6	**55.6**	2.67	2.00	**2.11**	5.2	21.9	**14.8**
Mean		75.2	72.3	**73.5**	60.8	59.1	**59.8**	2.03	1.77	**1.88**	12.8	21.3	**17.6**
Variety	LSD	10.9	5.7	**5.83**	3.52	0.8	**1.57**	1.03	0.83	**0.67**	11.3	13.7	**10.2**
Year	p>			**0.005**			**0.0008**			**NS**			**0.001**
Year x Var	p>			**0.0001**			**NS**			**0.0001**			**0.002**
	CV%	8.68	5.6	**7.03**	3.47	0.9	**2.33**	30.6	33.20	**31.7**	52.8	45.1	**51.0**