

2004 VARIETAL RECOMMENDATION

Pryor

WestBred, LLC requests that 'Pryor' hard red winter wheat be considered for "Variety Recommendation in the State of Montana".

We move that Pryor be recommended as a hard red winter wheat for District 4 and other non-sawfly areas of Montana.

Pryor is a hard red winter wheat selected from the progeny of the cross Hatton x Abilene. Application for PVP has been submitted.

Over a 4 year period, 27 station years of data, Pryor has performed better than the check variety Neeley. It has also yielded better than the other checks. (Table 1). The average test weight is equal to Neeley and 2 lbs lower than Rocky (Table 2). The percent protein of Pryor is slightly less than that of Neeley and Rocky and 1% less than Tiber (Table 3). The average plant height of Pryor is 28.9 inches, which is 4 inches shorter than Neeley and shorter than all of the check varieties included in this summary (Table 4). The average heading date of Pryor is 165 days, (from Jan. 1,) which is equal to that of Neeley and Tiber and 3 days later than Rocky. (Table 5). Winter Survival data indicate that Pryor has winter hardiness equal to Neeley and is slightly greater than Rocky (Table 6).

Disease resistance data from Sidney and Williston indicate Pryor has better tolerance to leaf diseases than the compared checks except for Rampart (Table 7).

Milling and baking data from MSU 2000 through 2002 trials indicate that Pryor is similar to Neeley but exhibits higher flour yield than Neeley (Table 8, 9 and 10). Data from Con Agra and Pendleton Flour Mills show Pryor to be of acceptable quality (Table 11 and 12).

Submitted by: Craig Cook, WestBred, LLC

Table 1. Yield (bu/ac) of Pryor compared to check varieties in the MSU Intrastate Winter Wheat Trials
2000-2003 = 27 station years.

Entry	Year	Bozeman	Kalispell	Conrad	Havre	Huntley	Moccasin	Sidney	Williston	Avg. irr	no BZ,KS	Avg. All
											Avr. Dry	
Pryor	00	119.2	133.8	52.8	71.0	67.5		76.4	68.3	126.5	67.2	84.1
	01	111.8	83.5	10.8	23.6	13.4	44.8			97.7	23.2	48.0
	02	83.4	126.9		40.0		52.2	45.0	32.1	105.2	42.3	63.3
	03	100.7	63.7	64.9	37.3	85.7	45.1	69.9	60.5	82.2	60.6	66.0
	avg	103.8	102.0	42.8	43.0	55.5	47.4	63.8	53.6	102.9	50.6	66.1
Neeley	00	117.7	120.3	46.5	69.0	71.9		69.9	71.3	119.0	65.7	80.9
	01	104.4	72.7	10.2	19.9	18.1	42.3			88.6	22.6	44.6
	02	88.0	121.1		35.8		47.9	45.1	36.0	104.6	41.2	62.3
	03	97.0	60.9	64.0	30.3	94.9	40.4	69.3	69.0	79.0	61.3	65.7
	avg	101.8	93.8	40.2	38.8	61.6	43.5	61.4	58.8	97.8	50.1	64.2
Rocky	00	114.3	115.0	48.6	62.7	62.7		68.2	59.6	114.7	60.4	75.9
	01	93.7	84.9	13.6	25.3	11.7	50.7			89.3	25.3	46.7
	02	86.4	125.5		35.6		47.0	39.9	29.7	106.0	38.1	60.7
	03	96.0	58.3	67.0	29.6	103.3	43.5	69.6	57.3	77.2	61.7	65.6
	avg	97.6	95.9	43.1	38.3	59.2	47.1	59.2	48.9	96.8	48.7	63.0
Tiber	00	102.0	112.4	37.5	61.8	73.9		64.5	59.0	107.2	59.3	73.0
	01	107.3	84.9	13.4	22.5	17.4	44.7			96.1	24.5	48.4
	02	81.0	114.4		30.8		48.4	39.6	28.4	97.7	36.8	57.1
	03	95.2	51.0	57.7	26.9	76.0	38.0	61.0	60.3	73.1	53.3	58.3
	avg	96.4	90.7	36.2	35.5	55.8	43.7	55.0	49.2	93.5	45.4	59.6
Rampart*	00	112.6	112.4	37.5	55.8	73.9		64.5	59.0	112.5	58.1	73.7
	01	88.6	59.8	14.3	22.4	17.8	42.5			74.2	24.3	40.9
	02											
	03	83.9	42.4	60.9	30.5	80.7	40.2	50.5	47.4	63.2	51.7	54.6
	avg	95.0	71.5	37.6	36.2	57.5	41.4	57.5	53.2	83.3	46.5	57.0

*Rampart was not in trial 2002

Table 2. Test weight (lbs/bu) of Pryor compared to check varieties in the MSU Intrastate Winter Wheat Trials
2000-2003 = 27 station years.

<u>Entry</u>	<u>Year</u>	<u>Bozeman</u>	<u>Kalispell</u>	<u>Conrad</u>	<u>Havre</u>	<u>Huntley</u>	<u>Moccasin</u>	<u>Sidney</u>	<u>Williston</u>	<u>Avg. irr</u>	no BZ,KS	
											<u>Avr. Dry</u>	<u>Avg. All</u>
Pryor	00	61.0	61.9	62.3	61.8	62.1		62.9	63.2	61.5	62.5	62.2
	01	64.5	62.8	58.7	59.1	59.2	55.8			63.7	58.2	60.0
	02	54.7	61.6		58.1		59.2	58.9	54.7	58.2	57.7	57.9
	03	56.3	59.3	60.1	62.0	59.4	55.1	61.7	60.9	57.8	59.9	59.4
		59.1	61.4	60.4	60.3	60.2	56.7	61.2	59.6	60.3	59.7	59.9
Neeley	00	61.8	62.2	59.6	61.7	62.9		62.9	62.9	62.0	62.0	62.0
	01	63.7	60.7	56.0	58.2	59.7	54.1			62.2	57.0	58.7
	02	57.5	62.9		57.0		59.1	58.2	54.0	60.2	57.1	58.1
	03	59.2	61.7	61.3	61.3	60.4	54.8	63.0	62.4	60.5	60.5	60.5
		60.6	61.9	59.0	59.6	61.0	56.0	61.4	59.8	61.2	59.4	60.0
Rocky	00	62.7	64.4	63.1	62.4	63.7		63.3	63.1	63.6	63.8	62.8
	01	64.8	63.2	61.7	60.0	59.5	59.6			64.0	62.5	60.9
	02	57.6	64.2		59.7		61.9	60.6	56.3	60.9	64.2	59.7
	03	60.3	63.0	64.2	61.9	63.1	56.5	63.6	63.4	61.7	63.6	63.1
		61.4	63.7	63.0	61.0	62.1	59.3	62.5	60.9	62.5	61.5	61.8
Tiber	00	62.2	63.4	58.5	61.3	63.0		63.8	62.7	62.8	61.0	59.9
	01	64.2	63.1	59.4	60.7	58.6	55.7			63.7	61.3	60.1
	02	58.7	63.5		60.7		59.8	60.8	56.5	61.1	63.5	60.7
	03	59.9	61.9	62.0	61.7	62.7	56.4	63.1	62.7	60.9	62.0	61.9
		61.3	63.0	60.0	61.1	61.4	57.3	62.6	60.6	62.1	60.5	61.0
Rampart	00	62.0	63.3	62.0	59.8	62.4		62.7	61.7	62.7	62.7	60.9
	01	64.1	61.6	58.7	58.3	58.0	58.5			62.9	60.2	58.5
	02											
	03	59.3	61.9	61.7	61.2	62.0	57.0	62.2	61.2	60.6	61.8	61.5
		61.8	62.3	60.8	59.8	60.8	57.8	62.5	61.5	62.0	60.5	60.9

*Rampart was not in trial 2002

Table 3. Protein (%) of Pryor compared to check varieties in the MSU Intrastate Winter Wheat Trials
2000-2003 = 27 station years.

<u>Entry</u>	<u>Year</u>	<u>Bozeman</u>	<u>Kalispell</u>	<u>Conrad</u>	<u>Havre</u>	<u>Huntley</u>	<u>Moccasin</u>	<u>Sidney</u>	<u>Williston</u>	<u>Avg. irr</u>	no BZ,KS	
											<u>Avr. Dry</u>	<u>Avg. All</u>
Pryor	00	12.5	11.3	13.5	11.5	14.4		10.7	13.4	11.9	12.7	12.5
	01	12.1	12.7	13.9	13.3	14.0	15.9			12.4	14.3	13.7
	02	15.3	11.6		13.7		15.0	11.9	14.1	13.5	13.7	13.6
	03	14.1	13.0	13.3	15.5	14.9	15.4	11.1	13.2	13.6	13.9	13.8
		13.5	12.2	13.6	13.5	14.4	15.4	11.2	13.6	12.8	13.6	13.4
Neeley	00	13.8	12.2	14.3	11.3	14.4		10.9	13.6	13.0	12.9	12.9
	01	12.5	11.8	13.2	13.2	14.8	15.1			12.2	14.1	13.4
	02	15.8	12.5		14.3		15.0	12.8	14.4	14.2	14.1	14.1
	03	14.9	13.5	13.7	15.6	15.3	15.3	11.6	13.6	14.2	14.2	14.2
		14.3	12.5	13.7	13.6	14.8	15.1	11.8	13.9	13.4	13.8	13.7
Rocky	00	12.5	12.5	14.5	10.7	13.9		11.5	12.5	12.5	12.6	12.6
	01	13.1	13.0	13.7	13.6	15.7	14.5			13.1	14.4	13.9
	02	14.9	12.1		14.2		14.7	13.3	14.4	13.5	14.2	13.9
	03	14.2	13.1	13.9	15.0	13.9	15.9	11.3	13.8	13.7	14.0	13.9
		13.7	12.7	14.0	13.4	14.5	15.0	12.0	13.6	13.2	13.8	13.6
Tiber	00	13.7	12.6	14.5	11.9	14.2		12.3	15.0	13.2	13.6	13.5
	01	13.8	13.4	14.2	14.1	17.2	15.7			13.6	15.3	14.7
	02	15.4	12.8		14.9		15.3	13.9	15.2	14.1	14.8	14.6
	03	15.2	14.1	14.4	16.1	14.9	15.2	13.7	14.6	14.7	14.8	14.8
		14.5	13.2	14.4	14.3	15.4	15.4	13.3	14.9	13.9	14.6	14.4
Rampart	00	13.8	13.2	15.6	12.8	15.2		13.0	15.4	13.5	14.4	14.1
	01	14.4	14.2	15.4	14.8	16.8	16.2			14.3	15.8	15.3
	02											
	03	15.0	14.1	14.7	16.0	15.9	16.2	15.0	15.4	14.6	15.5	15.3
		14.4	13.8	15.2	14.5	16.0	16.2	14.0	15.4	14.1	15.2	14.9

*Rampart was not in trial 2002

Table 4. Plant Height (in inches) of Pryor compared to check varieties in the MSU Intrastate Winter Wheat Trials 2000-2003 = 27 station years.

<u>Entry</u>	<u>Year</u>	<u>Bozeman</u>	<u>Kalispell</u>	<u>Conrad</u>	<u>Havre</u>	<u>Huntley</u>	<u>Moccasin</u>	<u>Sidney</u>	<u>Williston</u>	<u>Avg. irr</u>	no BZ,KS	
											<u>Avg. Dry</u>	<u>Avg. All</u>
Pryor	00	34.7	45.0	28.0	29.3	29.5		28.2	27.6	39.9	28.5	31.8
	01	26.8	24.3	18.0	18.4	12.2	26.3			25.6	18.7	21.0
	02	40.4	33.9		25.7		30.2	29.0	22.8	37.2	26.9	30.3
	03	37.0	25.8	34.0	28.6	34.7	30.3	31.9	28.7	31.4	31.4	31.4
		34.7	32.3	26.7	25.5	25.5	28.9	29.7	26.4	33.5	27.0	28.9
Neeley	00	40.3	49.7	33.0	33.7	32.7		31.4	27.6	45.0	31.7	35.5
	01	31.7	26.8	22.0	20.3	17.4	30.7			29.3	22.6	24.8
	02	46.5	39.1		26.0		30.2	33.9	29.1	42.8	29.8	34.1
	03	40.3	29.1	39.0	29.0	44.0	37.0	37.2	32.0	34.7	36.4	36.0
		39.7	36.2	31.3	27.3	31.4	32.6	34.2	29.6	37.9	30.9	33.0
Rocky	00	38.9	50.3	31.0	33.6	34.9		31.0	27.6	44.6	31.6	35.3
	01	28.6	26.1	19.0	18.2	12.6	33.7			27.4	20.9	23.0
	02	46.2	40.3		26.8		33.8	32.0	28.5	43.3	30.3	34.6
	03	40.8	26.8	38.0	30.0	45.4	41.0	38.5	32.8	33.8	37.6	36.7
		38.6	35.9	29.3	27.2	31.0	36.2	33.8	29.6	37.3	31.0	32.8
Tiber	00	43.6	51.7	31.0	33.9	36.1		33.0	31.8	47.7	33.2	37.3
	01	32.5	31.9	21.0	18.5	16.5	31.4			32.2	21.9	25.3
	02	48.3	41.7		27.3		34.1	33.5	29.5	45.0	31.1	35.7
	03	42.9	32.7	40.0	31.5	43.3	38.7	40.3	34.3	37.8	38.0	38.0
		41.8	39.5	30.7	27.8	32.0	34.7	35.6	31.9	40.7	31.9	34.5
Rampart	00	38.8	48.8	21.0	30.9	33.1		30.7	29.8	43.8	29.1	33.3
	01	29.9	26.4	19.0	18.7	14.9	30.2			28.2	20.7	23.2
	02											
	03	37.7	25.9	37.0	29.4	40.1	37.3	34.0	31.1	31.8	34.8	34.1
		35.5	33.7	25.7	26.3	29.4	33.8	32.4	30.5	34.6	29.1	30.7

*Rampart was not in trial 2002

Table 5. Heading Date (from 1/1) of Pryor compared to check varieties in the MSU Intrastate Winter Wheat Trials 2000-2003 = 28 station years.

<u>Entry</u>	<u>Year</u>	<u>Bozeman</u>	<u>Kalispell</u>	<u>Conrad</u>	<u>Havre</u>	<u>Huntley</u>	<u>Moccasin</u>	<u>Sidney</u>	<u>Williston</u>	<u>Avg. irr</u>	no BZ,KS	
											<u>Avr. Dry</u>	<u>Avg. All</u>
Pryor	00	166.0	159.0	160.0	155.4	150.3	165.6	157.0	158.7	162.5	157.8	159.0
	01	167.5	159.7	165.0	163.0	158.5	168.5			163.6	163.8	163.7
	02	175.7	167.3		179.7		175.7	172.9	175.0	171.5	175.8	174.4
	03	169.3	157.0	168.0	161.3	158.7	171.3	164.3	167.3	163.2	165.2	164.7
	avg	169.6	160.8	164.3	164.9	155.8	170.3	164.7	167.0	165.2	164.8	164.9
Neeley	00	167.7	160.3	160.0	156.2	150.7	167.0	157.0	156.7	164.0	157.9	159.5
	01	167.8	158.7	166.0	162.3	158.6	169.9			163.3	164.2	163.9
	02	176.3	167.3		177.0		176.0	172.9	174.7	171.8	175.2	174.0
	03	168.6	156.1	170.0	161.6	159.0	170.3	162.2	165.3	162.4	164.7	164.1
	avg	170.1	160.6	165.3	164.3	156.1	170.8	164.0	165.6	165.4	164.7	164.9
Rocky	00	162.3	157.0	159.0	153.5	148.0	162.2	154.3	155.7	159.7	155.5	156.5
	01	161.9	159.7	161.0	159.7	158.2	166.3			160.8	161.3	161.1
	02	173.3	165.0		174.0		173.0	171.4	175.0	169.2	173.4	172.0
	03	166.2	152.3	165.0	159.2	152.5	167.0	158.0	163.3	159.3	160.8	160.4
	avg	165.9	158.5	161.7	161.6	152.9	167.1	161.2	164.7	162.2	161.8	161.9
Tiber	00	167.3	159.7	164.0	155.5	150.7	166.0	156.7	158.0	163.5	158.5	159.7
	01	167.2	160.3	165.0	161.0	160.2	167.6			163.8	163.5	163.6
	02	175.0	168.0		177.3		175.0	173.5	175.7	171.5	175.4	174.1
	03	169.6	157.0	167.0	161.2	158.2	169.7	163.1	166.0	163.3	164.2	164.0
	avg	169.8	161.3	165.3	163.8	156.4	169.6	164.4	166.6	165.5	164.6	164.8
Rampart	00	164.3	158.0	160.0	155.4	149.0	164.3	156.0	158.3	161.2	157.2	158.2
	01	165.3	154.7	162.0	160.7	158.3	167.0			160.0	162.0	161.3
	02											
	03	167.7	156.2	167.0	161.2	155.7	167.7	163.4	165.7	162.0	163.5	163.1
	avg	165.8	156.3	163.0	159.1	154.3	166.3	159.7	162.0	161.0	160.7	160.8

*Rampart was not in trial 2002

Table 6. Winter Hardiness (% survival) of Pryor compared to check varieties in the MSU Intrastate Winter Wheat Trials 2000-2003 = 6 station years.

<u>Entry</u>	<u>Year</u>	<u>Sidney</u>	<u>Williston</u>	<u>Avg. All</u>
Pryor	00	86.6	76.5	81.6
	02	71.1	19.2	45.2
	03	61.6	34.2	47.9
		73.1	43.3	58.2
Neeley	00	83.4	61.9	72.7
	02	57.8	26.1	42.0
	03	67.8	50.8	59.3
		69.7	46.3	58.0
Rocky	00	79.9	66.9	73.4
	02	51.1	17.2	34.2
	03	80.7	41.7	61.2
		70.6	41.9	56.3
Tiber	00	91.7	70.9	81.3
	02	61.1	14.9	38.0
	03	76.2	50.8	63.5
		76.3	45.5	60.9
Rampart	00	79.8	39.6	59.7
	02			
	03	47.9	22.5	35.2
		63.9	31.1	47.5

*Rampart was not in trial 2002

Table 7. Disease reaction of Pryor compared to check varieties in the MSU Intrastate Winter Wheat Trials 2000

<u>Entry</u>	<u>Year</u>	<u>Sidney</u> tan spot	<u>Williston</u> leaf disease %
Pryor	00	6.7	15.0
Neeley	00	11.5	22.5
Rocky	00	13.7	40.0
Tiber	00	13.5	17.5
Rampart	00	9.8	7.5

Table 8.

2000 INTRASTATE WINTER WHEAT YIELD TRIAL

Means across locations: Bozeman, Havre, Moccasin and Conrad, MT

Variety	Wheat Protein, % (12% m.b.)	Wheat Ash, %	Flour Yield, %	Flour Protein, % (14% m.b.)	Flour Ash, %	Type	Mixograph			Test Bake				Wheat Protein-Flour Protein
							Tolerance	Mixing Time, min	Water Absorption, %	Mixing Time, min	Water Absorption, %	Loaf Volume	Crumb Grain Score	
Neddy	13.4		65.9	11.5	0.31		4	3.2	60.8	4.6	71.1	1008	4	1.9
Rampart	14.3		67.1	12.4	0.33		3	3.5	62.3	6.6	73.1	1074	4	1.9
Tiber	13.6		64.0	11.6	0.3		2	2.9	61.2	4.8	71.7	993	3	2.0
Rocky	12.9		64.8	11.2	0.34		4	3.7	60.9	5.6	71.7	975	4	1.7
Piyor	12.7		68.5	10.9	0.33		2	2.7	60.8	3.5	70.4	998	3	1.8

Table 9.

2001 INTRASTATE WINTER WHEAT YIELD TRIAL

Means across locations: Bozeman, Havre, Huntley and Conrad, MT

						Mixograph				Test Bake				
Variety	Wheat Protein, % (12% m.b.)	Wheat Ash, %	Flour Yield, %	Flour Protein, % (14% m.b.)	Flour Ash, %	Type	Tolerance	Mixing Time, min	Water Absorption, %	Mixing Time, min	Water Absorption, %	Loaf Volume	Crumb Grain Score	Wheat Protein-Flour Protein
Neeley	13.5	1.5	63.5	11.6	0.37		4	3.6	60.2	6.0	69.7	1036	3	1.9
Rampart	15.1	1.5	64.6	13.0	0.35		3	4.2	62.1	7.7	72.2	1168	4	2.1
Tiber	14.5	1.4	64.3	12.4	0.33		3	3.5	61.5	6.7	70.8	1086	3	2.1
Rocky	13.6	1.4	63.7	11.6	0.36		4	4.6	60.4	7.5	71.5	1014	4	2.0
Pryor	13.9	1.4	64.6	11.7	0.36		3	3.1	60.7	5.1	69.8	1066	3	2.2

Table 10.

2002 INTRASTATE WINTER WHEAT NURSERY M&B

Means across locations: Bozeman, Havre, Kalispell and Moccasin, MT

					Mixograph				Test Bake					
Variety	Wheat Protein (12% <i>m.b.</i>)	Wheat Ash %	Flour Yield, %	Flour Protein, % (14% <i>m.b.</i>)	Flour Ash, %	Type	Tolerance	Mixing Time, min	Water Absorption, %	Mixing Time, min	Water Absorption, %	Loaf Volume	Crumb Grain Score	Wheat Protein - Flour Protein
Neeley	14.5	1.7	62.7	12.2	0.40		5.8	5.3	60.3	9.5	70.7	1091	3.0	2.3
Tiber	15.1	1.6	64.4	12.6	0.33		5.0	3.3	61.7	7.4	71.4	1091	4.0	2.5
Rocky	14.4	1.6	62.7	12.2	0.36		6.5	6.4	59.6	10.2	71.2	1005	3.8	2.2
Pryor	14.1	1.5	64.5	11.9	0.39		4.0	3.5	59.6	5.4	69.4	1045	3.0	2.2

Table 11. Quality analysis of HRS and HRW samples sent to Conagra
Samples are from Bozeman 2000

<u>Description</u>	<u>NIT Wheat Moist</u>	<u>LECO Wheat Protein</u>	<u>ON Wheat Ash</u>	<u>Wheat Fall No.</u>	<u>Test Weight</u>	<u>Flour ON Ash</u>	<u>SKCS Kernel Dia</u>	<u>SKCS Hrdness</u>	<u>SKCS TKW</u>
CDC Falcon	8.3	14.4	1.213	560	62.7	0.447	2.33	78	29.8
Pryor	8.7	14.2	1.179	548	63.8	0.392	2.34	87	29.6
Rampart	8.8	15.3	1.281	459	63.6	0.413	2.29	85	28.8
Neeley	8.6	13.9	1.224	465	63	0.371	2.39	83	30.2

<u>Description</u>	<u>BAKE ABS</u>	<u>BAKE MIX</u>	<u>BAKE VOLUME</u>	<u>DOUGH TOTAL SCORE (45)</u>	<u>EXTERNAL SCORE</u>	<u>INTERNAL TOTAL (45)</u>	<u>SPONGE & DOUGH TOTAL (100)</u>
CDC Falcon	62.5	30	2625	40	9	39	88
Pryor	63.0	13	2625	39	7	33	79
Rampart	62.5	60	2725	28	9	43	80
Neeley	64.0	20	2700	38	10	37	85

Table 12. Quality Analysis of HRW Samples sent to Pendleton Flour Mills Blackfoot, ID 2001

Variety	Grain Moisture	Grain Pro(12%)	Grain Ash(14%)	Test Wt. lb/bu	Flour Yield(%)	Flour Pro(14%)	Abs.	Farinograph Peak	MTI	Stability	Loaf Volume	Bake Score
Pryor	9.6	12.3	1.551	61.1	71.9	11.4	56.6	7.5	20	22	3150	83
Neeley	9.5	12.7	1.627	60.4	68.8	11.4	57.4	6	20	14	3200	78