

2005 VARIETAL RECOMMENDATION

NORPRO

AgriPro Wheat requests that “Norpro” hard red spring wheat be considered for variety recommendation in the state of Montana.

We move that Norpro be recommended for all suitable Montana cropping districts for both dryland and irrigated management.

AgriPro Wheat released Norpro in 2000 and PVP was issued in 2001. It was derived from the cross “Norseman/2369//Dalen”. It is a hollow stemmed, hard red spring variety. The initial marketing area has been Eastern North and South Dakota and Minnesota. Recent test data show that Norpro is well adapted to the spring areas of Montana.

Norpro has been tested in Montana State Trials during the 2002 through 2004 seasons. During this period (29 station years, Table 1), Norpro has outyielded all checks (top four varieties by acreage) in irrigated trials. It was second to Reeder in dryland trials. In the over-all average, it was higher yielding than all checks. Its test weight and heading (Tables 2 & 3) fall within the range of the checks. Its height (Table 4) is slightly shorter than the shortest check, Conan. Protein levels (Table 5) have been slightly lower than the checks at .3% lower than McNeal.

No disease scores have been observed in Montana testing. Based on ratings in North Dakota and Minnesota, Norpro has resistance to stem rust and moderate resistance to leaf rust. Foliar disease tolerance has been rated as moderate, similar to Reeder. Norpro is moderately susceptible to fusarium head blight.

Milling and baking data from MSU for 2002 and 2003 (Table 6) show that Norpro has acceptable overall breadmaking quality. Norpro has mixing strength similar to Reeder. With its slightly lower protein, the water absorption is also slightly lower than the checks. Its baking data has been similar to the checks.

Prepared and submitted by : Joe A. Smith, Spring Wheat Breeder, AgriPro Wheat

**TABLE 1. 2002-4 YIELD (BU/A) SUMMARY OF NORPRO AND KNUDSON COMPARED TO CHECK VARIETIES
(MSU ADVANCED SPRING WHEAT TRIALS - 29 STATION YEARS)**

VARIETY	YEAR	HAVRE	CON.	MOC.	HUNT. DRY	HUNT. IRR	SID. DRY	SID. IRR	BOZE. DRY	BOZE. IRR	KALIS.	IRR AVG	DRY AVG	AVG
NORPRO	02	34.2	46.4		6.5	126.6	45.6	53.6	78.5	93.4	106.3	91.2	52.9	65.7
NORPRO	03	9.4	50.2	12.6	36.5	83.5	65.8	115.8	39.3	77.8	82.3	92.3	42.3	57.3
NORPRO	04	39.1	59.9	32.2	33.5	118.5	70.6	80.0	92.6	104.3	94.4	100.9	60.3	72.5
	AVG	27.6	52.2	22.4	25.5	109.5	60.7	83.1	70.1	91.8	94.4	94.8	50.4	65.2
KNUDSON	02	33.0	43.6		10.9	107.0	45.7	59.7	71.1	79.6	105.3	82.1	51.6	61.8
KNUDSON	03	7.0	46.6	14.2	36.8	54.6	63.8	106.2	38.6	69.2	83.0	76.7	41.4	52.0
KNUDSON	04	38.6	60.2	36.9	32.9	115.2	68.3	79.3	84.6	97.7	93.3	97.4	59.2	70.7
	AVG	26.2	50.1	25.5	26.9	92.3	59.3	81.7	64.7	82.2	93.9	85.4	49.5	61.5
MCNEAL	02	36.3	41.5		9.3	118.5	43.4	56.7	69.6	88.1	102.0	87.8	50.4	62.8
MCNEAL	03	13.9	49.5	20.3	36.0	88.1	60.7	107.5	39.8	65.3	78.5	87.0	42.7	56.0
MCNEAL	04	40.8	57.5	36.9	39.0	114.4	68.3	83.4	85.3	102.8	86.8	100.2	59.2	71.5
	AVG	30.3	49.5	28.6	28.1	107.0	57.5	82.5	64.9	85.4	89.1	91.6	49.7	63.4
REEDER	02	34.9	49.1		13.8	125.5	52.5	52.0	63.3	73.4	109.5	83.6	53.9	63.8
REEDER	03	12.4	53.9	18.4	40.6	85.5	67.6	102.5	44.5	74.7	87.4	87.6	46.4	58.7
REEDER	04	40.9	60.7	37.9	32.8	110.5	68.0	88.8	85.4	97.2	92.4	98.8	59.7	71.5
	AVG	29.4	54.6	28.1	29.1	107.2	62.7	81.1	64.4	81.8	96.4	90.0	52.1	64.7
ERNEST	02	36.4	45.7		7.6	117.0	40.8	49.9	56.9	69.8	95.8	78.9	47.2	57.8
ERNEST	03	11.8	42.6	15.9	33.1	86.0	54.7	92.8	41.9	74.1	75.9	84.3	39.4	52.9
ERNEST	04	39.8	56.7	34.1	35.1	114.0	61.2	76.4	80.5	90.5	89.3	93.7	56.7	67.8
	AVG	29.3	48.3	25.0	25.3	105.7	52.2	73.1	59.8	78.1	87.0	85.6	46.7	59.5
CONAN	02	33.7	40.8		11.0	109.5	33.7	47.3	68.9	84.1	91.6	80.3	46.6	58.5
CONAN	03	13.5	45.9	17.8	35.6	77.5	55.7	88.3	37.8	68.9	79.7	78.2	40.8	52.1
CONAN	04	43.3	58.0	39.2	28.3	113.4	59.1	76.1	81.7	89.9	99.0	93.1	58.4	68.8
	AVG	30.2	48.2	28.5	25.0	100.1	49.5	70.6	62.8	81.0	90.1	83.9	47.7	59.8

**TABLE 4. 2002-4 HEIGHT (IN.) SUMMARY OF NORPRO AND KNUDSON COMPARED TO CHECK VARIETIES
(MSU ADVANCED SPRING WHEAT TRIALS - 29 STATION YEARS)**

VARIETY	YEAR	HAVRE	CON.	MOC.	HUNT. DRY	HUNT. IRR	SID. DRY	SID. IRR	BOZE. DRY	BOZE. IRR	KALIS.	AVG
NORPRO	02	21.7	27.0		21.0	34.0	24.2	25.2	32.3	34.3	28.5	27.6
NORPRO	03	20.0	30.0	24.0	29.1	32.1	29.9	34.3	27.7	31.6	31.3	29.0
NORPRO	04	28.0	29.0	29.9	21.6	40.7	30.0	29.3	33.2	34.8	34.7	31.1
	AVG	23.2	28.7	26.9	23.9	35.6	28.1	29.6	31.1	33.6	31.5	29.2
KNUDSON	02	20.7	27.0		24.0	35.2	24.9	25.7	36.0	37.8	31.4	29.2
KNUDSON	03	19.9	33.0	24.3	30.5	34.5	31.3	37.1	28.5	32.0	32.7	30.4
KNUDSON	04	29.2	35.0	33.8	21.2	41.0	30.3	32.0	36.1	37.9	35.3	33.2
	AVG	23.3	31.7	29.1	25.2	36.9	28.8	31.6	33.5	35.9	33.1	30.9
MCNEAL	02	24.2	28.0		23.0	37.1	25.9	27.7	35.5	38.9	32.7	30.3
MCNEAL	03	21.8	34.0	25.0	29.8	35.1	33.2	39.0	29.6	33.1	31.8	31.2
MCNEAL	04	29.7	34.0	37.5	24.9	40.9	31.0	33.2	36.5	39.7	36.8	34.4
	AVG	25.2	32.0	31.3	25.9	37.7	30.0	33.3	33.9	37.3	33.7	32.0
REEDER	02	23.3	29.0		24.1	39.8	25.6	27.8	36.6	39.8	32.1	30.9
REEDER	03	21.3	34.0	25.7	30.4	35.5	33.4	40.5	30.7	35.1	35.2	32.2
REEDER	04	31.1	37.0	32.5	20.1	44.8	32.7	35.4	39.2	40.1	37.6	35.1
	AVG	25.2	33.3	29.1	24.9	40.0	30.6	34.6	35.5	38.3	35.0	32.7
ERNEST	02	25.7	33.0		23.6	45.5	29.1	34.7	44.1	46.9	35.1	35.3
ERNEST	03	24.2	39.0	26.0	34.0	38.6	37.3	43.1	33.1	37.8	39.1	35.2
ERNEST	04	33.0	39.0	39.3	26.2	48.5	33.7	37.6	42.9	45.8	40.1	38.6
	AVG	27.6	37.0	32.7	27.9	44.2	33.3	38.4	40.0	43.5	38.1	36.4
CONAN	02	22.5	26.0		21.3	34.8	23.4	25.6	33.1	35.9	28.9	27.9
CONAN	03	20.5	30.0	23.3	28.6	29.1	30.7	36.0	27.3	32.0	32.2	29.0
CONAN	04	30.4	34.0	31.9	20.9	39.3	29.5	31.9	36.4	36.1	34.8	32.5
	AVG	24.5	30.0	27.6	23.6	34.4	27.9	31.2	32.3	34.6	31.9	29.8

**TABLE 3. 2002-4 DAYS TO HEADING SUMMARY OF NORPRO AND KNUDSON COMPARED TO CHECK VARIETIES
(MSU ADVANCED SPRING WHEAT TRIALS - 29 STATION YEARS)**

VARIETY	YEAR	HAVRE	CON.	MOC.	HUNT. DRY	HUNT. IRR	SID. DRY	SID. IRR	BOZE. DRY	BOZE. IRR	KALIS.	AVG
NORPRO	02	188.0	186.0		174.0	173.0	181.0	181.0	184.0	184.0	181.0	181.4
NORPRO	03	177.6	181.0	183.0	166.7	166.2	169.3	174.1	184.0	180.0	173.3	175.5
NORPRO	04	182.1	185.0	184.0	158.7	161.3	172.6	178.0	182.0	181.0	167.7	175.2
	AVG	182.6	184.0	183.5	166.5	166.8	174.3	177.7	183.3	181.7	174.0	177.4
KNUDSON	02	187.0	185.0		173.0	173.0	180.0	182.0	186.0	185.0	183.0	181.7
KNUDSON	03	179.8	183.0	182.7	166.7	165.9	170.0	175.9	184.0	180.0	173.0	176.1
KNUDSON	04	182.3	185.0	185.4	158.7	162.0	173.6	179.0	182.0	181.0	168.7	175.8
	AVG	183.1	184.3	184.0	166.1	167.0	174.5	179.0	184.0	182.0	174.9	177.9
MCNEAL	02	188.0	186.0		175.0	174.0	182.0	184.0	186.0	186.0	184.0	182.8
MCNEAL	03	180.7	183.0	183.7	167.0	167.1	171.0	179.2	187.0	182.0	173.1	177.4
MCNEAL	04	181.6	185.0	185.7	160.0	161.4	175.9	182.3	183.0	182.0	168.7	176.6
	AVG	183.4	184.7	184.7	167.3	167.5	176.3	181.8	185.3	183.3	175.3	178.9
REEDER	02	187.0	183.0		173.0	171.0	181.0	182.0	184.0	184.0	180.0	180.5
REEDER	03	179.2	180.0	182.7	165.3	164.2	168.0	174.0	184.0	180.0	173.0	175.0
REEDER	04	182.1	185.0	184.6	158.3	159.3	173.4	178.7	181.0	181.0	167.6	175.1
	AVG	182.8	182.7	183.7	165.5	164.9	174.1	178.2	183.0	181.7	173.5	176.9
ERNEST	02	187.0	186.0		175.0	172.0	181.0	182.0	184.0	183.0	186.0	181.7
ERNEST	03	177.5	183.0	182.4	166.0	166.0	170.0	175.3	183.0	180.0	173.7	175.7
ERNEST	04	182.2	184.0	185.0	160.2	160.9	173.6	178.0	182.0	182.0	170.7	175.9
	AVG	182.2	184.3	183.7	167.1	166.3	174.9	178.4	183.0	181.7	176.8	177.8
CONAN	02	188.0	185.0		171.0	171.0	179.0	182.0	183.0	184.0	179.0	180.3
CONAN	03	179.7	181.0	181.7	165.0	164.9	168.0	175.8	184.0	179.0	171.4	175.0
CONAN	04	180.1	185.0	183.6	157.3	159.0	171.5	178.0	181.0	180.0	166.5	174.2
	AVG	182.6	183.7	182.6	164.4	165.0	172.8	178.6	182.7	181.0	172.3	176.5

TABLE 6. 2002 AND 2003 QUALITY SUMMARY - MSU DATA

PEDIGREE	CLASS	Wheat Protein, % (12%mb.)	Flour Protein, % (14%mb.)	Flour Yield, %	Flour Ash, %	Mixing Tolerance	Mixing Time, min	Mix Water Absorption, %	Bake Mixing Time, min	Bake Water Absorption, %	Loaf Volume	Crumb Grain Score
2003 ADVANCED SPRING WHEAT NURSERY - MEANS ACROSS LOCATIONS - HAVRE, SIDNEY, MOCCASIN, BOZEMAN												
NORPRO	HRS	17.1	60.9	14.1	0.51	4.5	3.2	65.1	4.40	74.7	1143.8	3.5
KNUDSON	HRS	17.3	65.3	14.6	0.48	6.5	5.1	67.3	12.13	80.0	1171.3	3.8
MCNEAL	HRS	17.8	62.8	14.8	0.47	6.0	5.5	64.1	8.55	76.8	1270.0	3.3
REEDER	HRS	17.5	65.4	14.6	0.41	3.0	2.8	63.8	3.53	72.7	1137.5	2.5
ERNEST	HRS	18.3	66.9	15.4	0.43	4.8	3.6	64.4	7.13	74.1	1266.3	3.5
CONAN	HRS	17.4	64.6	14.2	0.46	5.3	4.3	62.9	6.93	73.4	1225.0	4.0
TRIAL AVG		17.5	64.6	14.6	0.5	4.5	3.7	64.2	5.9	74.2	1184.2	3.3
2002 ADVANCED SPRING WHEAT NURSERY - MEANS ACROSS LOCATIONS - HAVRE, SIDNEY, BOZEMAN												
NORPRO	HRS	15.1	62.5	12.3	0.4	3.7	3.4	62.1	5.3	72.1	1103	3.7
KNUDSON	HRS	15.6	65.2	12.9	0.4	6.7	5.8	64.2	14.8	78.1	1065	3.0
MCNEAL	HRS	15.8	62.8	13.1	0.4	7.0	7.0	64.7	12.5	77.3	1217	4.0
REEDER	HRS	16.0	63.3	13.5	0.4	3.7	3.2	64.0	4.8	73.1	1110	2.0
ERNEST	HRS	16.3	66.3	13.6	0.4	5.0	4.3	65.0	12.1	75.2	1203	3.3
CONAN	HRS	16.2	61.4	13.1	0.4	4.7	4.8	63.5	7.4	73.5	1142	3.3
TRIAL AVG		15.7	64.7	13.2	0.4	5.0	4.7	63.9	8.7	74.3	1152	3.0

AgriPro Spring Wheat Quality Summary

Year-Loc	Flour/Wheat Quality								Baking Quality						Comments
	Wht Prot	Flr Prot	Norris Hard	Flr Yld	Ash	Mixogram			Bake Abs	BakePk Time	Loaf Vol	Crumb			
						Peak Time	Peak HT	Tol.				Grain	Tex	Color	
	14%mb	14%mb		%	14%mb	min	N.U.	mm	%	min	cc	R	R	R	
NORPRO															
2001 - MW	15.0	13.3	86	64.8	0.416	3.50	5.0	928	64.0	3.50	1040	5	3	3	R
2002 - MW	14.4	13.4	86	66.3	0.487	4.25	5.3	1072	68.0	5.00	1035	3	3	3	
2003 - BKPR	14.5	12.8	85	70.3	0.440	2.75	5.5	828	65.5	2.60	1035	3	3	3	
2004 - BKPR	14.3	12.8	104	71.4	0.466	2.75	5.3	1361	66.0	2.70	895	4	3	3	
Average:	14.6	13.1	90	68.2	0.452	3.31	5.3	1047	65.9	3.45	1001	4	3	3	
REEDER															
2001 - MW	15.2	14.0	62	69.5	0.361	3.50	5.0	1100	65.0	3.50	1075	5	2	3	
2002 - MW	15.1	14.2	54	69.2	0.443	4.00	5.3	1165	67.5	5.80	1110	6	2	3	
2003 - BKPR	14.7	13.7	53	70.6	0.389	3.00	5.3	877	67.0	3.00	995	5	3	4	
2004 - BKPR	14.9	13.6	83	69.4	0.401	3.25	5.0	1269	68.0	3.10	1045	5	3	4	
Average:	15.0	13.9	63	69.7	0.399	3.44	5.1	1103	66.9	3.85	1056	5	3	4	

AgriPro Spring Wheat Quality Summary

Year-Loc	Flour/Wheat Quality								Baking Quality						Comments
	Wht Prot	Flr Prot	Norris Hard	Flr Yld	Ash	Mixogram			Bake Abs	BakePk Time	Loaf Vol	Crumb			
						Peak Time	Peak HT	ToL				Grain	Tex	Color	
	14%mb	14%mb		%	14%mb	min	N.U.	mm	%	min	cc	R	R	R	
NORPRO															
2000 - MW	12.8	11.6	81	68.6	0.418	3.50	5.0	1101	61.5	3.50	1005	3	3	3	
2001 - MW	15.0	13.3	86	64.8	0.416	3.50	5.0	928	64.0	3.50	1040	5	3	3	R
2002 - MW	14.4	13.4	86	66.3	0.487	4.25	5.3	1072	68.0	5.00	1035	3	3	3	
2002 - MW	14.6	13.1	82	66.7		4.00	5.3	1138	66.5	4.80	1120	4	3	3	
2002 - MW	15.5	13.7	85	65.8		4.25	5.3	1115	68.5	5.30	1085	3	3	3	
2002 - MW	14.4	13.2	83	66.5		4.00	5.3	1118	67.5	4.80	1060	3	3	2	
2002 - MW	14.6	13.2	80	66.6		4.00	5.5	1042	67.5	4.80	1040	4	3	3	
2003 - BKPR	14.5	12.8	85	70.3	0.440	2.75	5.5	828	65.5	2.60	1035	3	3	3	
2003 - BKPR	14.1	12.5	84	68.4	0.419	3.00	5.3	751	66.0	2.60	975	3	3	4	R
2003 - BKPR	13.8	12.5	75	68.9	0.421	3.75	5.3	834	66.5	2.80	1025	4	3	4	
2004 - BKPR	14.3	12.8	104	71.4	0.466	2.75	5.3	1361	66.0	2.70	895	4	3	3	
2004 - BKPR	14.2	12.7	93	68.6		3.00	5.0	1128	67.5	2.90	965	4	3	3	
2004 - BKPR	13.3	12.3	93	67.6		3.00	5.0	1170	66.0	2.70	980	4	3	3	
2004 - BKPR	14.1	13.2	90	71.1		3.25	5.0	1034	68.0	3.00	935	4	3	3	
2004 - BKPR	13.9	12.8	100	68.1		3.00	5.0	1050	68.0	3.30	850	3	3	3	
2004 - BKPR	14.5	13.2	91	70.8		3.25	5.0	1185	68.0	3.00	930	4	3	4	
2004 - BKPR	14.0	12.8	94	69.6		3.00	5.0	1129	68.0	2.70	985	4	3	4	
Average:	14.2	12.9	88	68.2	0.438	3.43	5.2	1058	66.6	3.53	998	4	3	3	
ALSEN															
2000 - MW	13.8	12.9	77	71.9	0.418	4.00	5.5	1143	64.5	4.00	1090	4	2	3	
2001 - MW	14.7	13.8	70	68.5	0.401	4.50	5.0	1124	65.0	4.50	1030	4	3	3	BUCKY
2002 - MW	15.5	14.3	68	67.1	0.466	6.25	5.3	1256	68.5	8.00	990	3	3	3	
2002 - MW	15.5	14.5	73	68.8		5.50	5.3	1119	69.5	7.00	1125	5	3	3	
2002 - MW	15.8	14.5	69	66.9		6.50	5.0	1186	69.5	7.70	1045	4	2	3	
2002 - MW	15.3	14.1	67	68.2		6.00	5.3	1205	69.0	7.00	1050	3	2	2	
2002 - MW	15.9	14.6	68	67.2		6.00	5.5	1200	69.5	8.00	1000	3	3	3	
2003 - BKPR	15.4	13.8	79	71.4	0.404	3.75	5.5	892	69.5	3.30	1100	4	3	3	
2003 - BKPR	15.2	13.7	85	70.1	0.412	3.75	5.5	950	69.0	3.10	1065	5	2	4	R
2003 - BKPR	14.8	13.7	75	70.9	0.412	3.75	5.5	957	68.5	3.30	1100	4	2	3	
2004 - BKPR	14.8	13.9	88	71.7	0.436	3.75	5.3	1393	68.5	3.30	1045	3	2	3	
2004 - BKPR	14.6	13.8	92	70.5		4.00	5.0	1268	70.0	4.00	1075	5	3	3	
2004 - BKPR	14.1	13.1	89	68.7		4.25	5.0	1285	69.0	4.10	1095	4	2	3	
2004 - BKPR	14.7	13.8	86	72.0		3.50	5.0	1242	69.5	3.50	890	4	3	3	
2004 - BKPR	14.7	13.5	88	70.2		4.00	5.0	1226	70.0	3.60	910	4	3	3	
2004 - BKPR	14.7	13.6	86	72.3		4.00	5.0	1226	70.5	3.80	1000	5	3	3	
2004 - BKPR	14.4	13.5	87	71.9		4.25	5.0	1285	70.5	4.00	935	5	3	3	
Average:	14.9	13.8	79	69.9	0.421	4.57	5.2	1174	68.9	4.84	1032	4	3	3	