2005 VARIETAL RECOMMENDATION

KNUDSON

AgriPro Wheat requests that "Knudson" hard red spring wheat be considered for variety recommendation in the state of Montana.

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

AgriPro Wheat released Knudson in 2001 and PVP was issued in 2002. It was derived from the cross "Karl/Krona//Bergen/Hamer sib". 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 Knudson is adapted to many of the spring wheat areas of Montana.

Knudson has been tested in Montana State Trials during the 2002 through 2004 seasons. During this period (29 station years, Table 1), Knudson yielded within the range of the checks (top four varieties by acreage) in the overall average. Its best relative performance has been in dryland test sites where it has averaged very similar to McNeal. In irrigated trials, its best performance has been at Bozeman and Sidney. Its test weight and heading (Tables 2 & 3) fall within the range of the checks. Its height (Table 4) is about one inch shorter than McNeal. Protein levels (Table 5) have been equal to McNeal.

No disease scores have been observed in Montana testing. Based on ratings in North Dakota and Minnesota, Knudson has resistance to stem rust and leaf rust. Foliar disease tolerance has been rated as moderate to moderately resistant, slightly better than Reeder. Knudson has moderate tolerance to fusarium head blight.

Milling and baking data from MSU for 2002 and 2003 (Table 6) show that Knudson has acceptable overall breadmaking quality. Knudson has strong mixing strength similar to McNeal. It has very good water absorption levels.

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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 2. 2002-4 TEST WT (LBS/BU) 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	61.5	61.9		47.9	62.4	56.0	60.3	59.1	62.2	62.0	59.2
NORPRO	03	57.1	54.5	47.6	62.3	62.2	62.2	62.9	55.5	59.2	58.9	58.2
NORPRO	04	58.0	61.6	54.0	63.3	63.0	62.0	63.3	63.1	63.0	61.4	61.3
	AVG	**58.9**	**59.3**	**50.8**	**57.8**	**62.5**	**60.1**	**62.2**	**59.2**	**61.5**	**60.8**	**59.6**
KNUDSON	02	60.9	61.0		51.7	62.4	57.2	60.5	60.2	62.5	61.4	59.7
KNUDSON	03	57.1	58.3	52.0	61.7	61.1	61.3	63.3	56.3	58.8	60.0	59.0
KNUDSON	04	60.0	61.9	56.3	62.6	62.2	62.4	63.7	61.8	61.3	60.8	61.3
	AVG	**59.3**	**60.4**	**54.2**	**58.7**	**61.9**	**60.3**	**62.5**	**59.4**	**60.9**	**60.7**	**60.0**
MCNEAL	02	60.2	61.9		48.0	62.8	58.2	60.3	59.6	62.1	59.9	59.2
MCNEAL	03	53.9	56.9	48.8	58.6	61.6	59.8	62.9	54.0	58.0	55.5	57.0
MCNEAL	04	57.2	61.8	55.0	62.4	63.4	60.0	62.4	60.7	62.5	60.9	60.6
	AVG	**57.1**	**60.2**	**51.9**	**56.3**	**62.6**	**59.3**	**61.9**	**58.1**	**60.9**	**58.8**	**58.9**
REEDER	02	60.6	61.7		50.7	63.2	58.3	61.1	60.3	62.3	61.8	60.0
REEDER	03	57.4	56.3	51.2	62.8	60.8	61.3	63.0	54.5	58.6	59.0	58.5
REEDER	04	59.2	60.2	56.2	63.7	63.2	61.8	63.0	62.8	62.7	61.6	61.5
	AVG	**59.1**	**59.4**	**53.7**	**59.1**	**62.4**	**60.5**	**62.4**	**59.2**	**61.2**	**60.8**	**60.0**
ERNEST	02	60.1	61.3		48.9	62.3	58.0	59.8	60.2	62.4	62.3	59.5
ERNEST	03	56.8	55.9	50.8	61.0	60.9	62.1	62.6	56.9	59.4	58.9	58.5
ERNEST	04	59.6	62.9	55.0	63.6	63.3	61.3	63.3	61.3	61.1	60.7	61.2
	AVG	**58.8**	**60.0**	**52.9**	**57.8**	**62.2**	**60.5**	**61.9**	**59.5**	**61.0**	**60.6**	**59.7**
CONAN	02	60.9	61.9		49.9	62.5	58.3	61.5	59.5	62.8	61.4	59.9
CONAN	03	56.7	54.7	51.6	61.8	58.6	61.2	62.6	55.0	58.3	58.7	57.9
CONAN	04	59.7	60.2	57.0	63.2	61.9	61.5	63.0	60.4	62.2	61.0	61.0
	AVG	**59.1**	**58.9**	**54.3**	**58.3**	**61.0**	**60.3**	**62.4**	**58.3**	**61.1**	**60.4**	**59.6**

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 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 5. 2002-4 PROTEIN (%) 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	15.8	13.4		19.9	12.7	15.3	10.4	14.3	14.1	14.9	14.5
NORPRO	03	18.0	17.2	19.7	11.4	15.3	14.9	15.0	18.2	16.0	15.7	16.1
NORPRO	04	15.8	10.5	16.8	11.6	13.3	15.9	14.5	13.1	13.5	14.1	13.9
	AVG	**16.5**	**13.7**	**18.2**	**14.3**	**13.8**	**15.4**	**13.3**	**15.2**	**14.5**	**14.9**	**14.8**
KNUDSON	02	16.6	13.6		19.8	12.9	15.4	10.4	14.7	13.9	14.5	14.6
KNUDSON	03	19.2	16.9	18.2	13.3	16.6	15.7	15.0	18.4	16.2	15.5	16.5
KNUDSON	04	16.9	10.4	17.7	13.6	12.7	15.6	13.3	13.8	13.2	14.0	14.1
	AVG	**17.6**	**13.6**	**18.0**	**15.6**	**14.1**	**15.6**	**12.9**	**15.6**	**14.4**	**14.7**	**15.1**
MCNEAL	02	15.7	13.5		19.4	12.9	15.8	10.4	15.8	15.0	14.8	14.8
MCNEAL	03	19.1	16.7	20.3	11.8	14.8	15.0	16.7	18.5	16.7	15.5	16.5
MCNEAL	04	17.2	11.2	17.2	12.2	13.2	14.2	12.9	14.8	13.2	15.2	14.1
	AVG	**17.3**	**13.8**	**18.7**	**14.5**	**13.6**	**15.0**	**13.3**	**16.4**	**15.0**	**15.2**	**15.1**
REEDER	02	16.4	13.7		19.6	14.4	15.6	12.1	16.0	15.8	15.4	15.4
REEDER	03	18.3	17.1	19.8	12.3	15.9	14.6	16.8	18.7	17.3	16.0	16.7
REEDER	04	16.6	10.9	18.4	12.2	13.9	13.4	14.6	13.5	13.5	14.3	14.1
	AVG	**17.1**	**13.9**	**19.1**	**14.7**	**14.7**	**14.5**	**14.5**	**16.1**	**15.5**	**15.2**	**15.4**
ERNEST	02	16.5	14.5		20.0	13.9	15.8	10.7	16.7	15.9	14.9	15.4
ERNEST	03	19.7	18.7	19.9	13.8	15.7	16.4	17.5	18.5	17.3	17.0	17.4
ERNEST	04	16.9	11.5	18.1	13.0	13.6	15.1	13.7	15.6	14.3	13.8	14.6
	AVG	**17.7**	**14.9**	**19.0**	**15.6**	**14.4**	**15.8**	**14.0**	**16.9**	**15.8**	**15.2**	**15.8**
CONAN	02	16.6	14.4		19.5	14.2	16.4	11.4	15.5	14.7	15.1	15.3
CONAN	03	18.2	17.7	19.6	14.0	16.0	14.8	15.6	18.9	17.1	15.7	16.8
CONAN	04	16.4	11.7	16.6	13.0	13.9	14.2	14.5	15.4	14.7	14.8	14.5
	AVG	**17.1**	**14.6**	**18.1**	**15.5**	**14.7**	**15.1**	**13.8**	**16.6**	**15.5**	**15.2**	**15.5**

TABLE 6. 2002 AND 2003 QUALITY SUMMARY - MSU DATA

PEDIGREE	CLASS	Wheat Protein, % (12%m.b.)	Flour Yield, %	Flour Protein, % (14%m.b.)	Flour Ash, %	Mixing Tolerance	Mixo Mixing Time, min	Mixo 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