

Motion: Add Genou to the list of Winter Wheat Varieties Recommended for Montana in sawfly areas only of Districts 3, 4, and 5.

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'Genou' (PI 640424) hard red winter wheat (*Triticum aestivum* L.) was developed by the Montana Agricultural Experiment Station and released in August 2004. Genou was released for its host plant resistance to the wheat stem sawfly (*Cephus cinctus* Nort.) conditioned by **stem solidness** along with **improved yield potential** and **cold tolerance** relative to other solid-stem winter wheat cultivars adapted to Montana. Genou (French for 'knee') was named for the "Knees" region of Montana, a key winter wheat production region of north central Montana where resistance to wheat stem sawfly is an important cultivar attribute.

Genou is an awned, white-chaffed, medium maturity, solid-stem hard red winter wheat. Genou has medium maturity, 162 d (n=36) to heading from 1 January, similar to Rampart (PI 593889), and approximately 2 d earlier than 'Neeley' (CItr 17860) and 'Morgan' (PI 599336). Genou is relatively tall (81 cm, n=60), similar to Neeley (81 cm), Morgan (81cm), and Rampart (79 cm). Coleoptile length of Genou (97 mm, n=3) is relatively long, shorter than that of Rampart (104 mm), but longer than that of Neeley (81 mm) and Morgan (58 mm). Winter survival in 8 trials showing differential survival (Table 1) was 55% for Genou compared to Morgan (69%, LSD_{0.05}=7%), Neeley (58%), and Rampart (46%). In these same 8 environments exhibiting differential winter survival, grain yield of Genou was significantly higher than that of Rampart although still significantly lower than more hardy cultivars (Table 1).

Table 1. 2002-2005 Intrastate Winter Wheat Test (Exp. 3501): Combined Locations Winter Survival and associated Yield Locations: 4 years at both Sidney and Williston, Conrad and Moccasin in 2004 = 10 locations

Cultivar/Line	Winter Survival (%)			Yield ^{1/} under Winterkill		
	2005	2004-2005	2003-2005	2005	2004-2005	2003-2005
location-years	2	6	8	2	6	8
Yellowstone	84.2*	60.4*	62.0	59.7*	59.5*	63.4**
Jerry	90.5*	66.1*	66.9*	66.1**	61.3**	61.8*
Morgan	91.2*	66.8*	69.0*	62.2*	58.7*	61.5*
Paul	88.7*	63.1*	61.9	61.2*	57.9*	59.9*
CDC Falcon	86.4*	64.2*	64.3	59.8*	56.6*	58.4*
Neeley	71.8	57.1	57.7	52.6	54.6	58.3*
Norstar	91.8**	67.9**	72.2**	54.7	54.2	58.0
Rocky	83.6*	61.7*	61.6	53.6	53.1	55.8
BigSky	85.1*	63.1*	62.6	51.4	53.9	55.7
Tiber	75.7	58.6	59.8	46.0	50.7	53.3
Genou	76.3*	56.3	55.0	47.3	48.8	51.3
Vanguard	68.9	63.2	50.2	45.8	45.9	47.8
Rampart	64.0	50.0	46.3	44.7	43.4	45.1
Average	76.0	57.8	58.5	52.8	53.2	55.3
LSD (0.05)	15.9	8.3	7.3	6.8	6.6	5.3
C.V.	10.4	12.6	12.7	9.8	11.9	10.3

** = indicates highest value within a column

^{1/} LSD for Yield based on genotype*environment mean square.

* = indicates varieties with values equal to highest variety within a column based on Fisher's protected LSD (p=0.05)

Stem solidness was evaluated on the scale of 5=hollow to 25=solid described by Cook et al. (2004). Stem solidness of Genou (19.6, n=22) was lower than stem solidness of Rampart (21.5, LSD_{0.05}=1.0) but higher than hollow-stemmed checks, Morgan (7.0) and Neeley (6.5). In six environments with differential cutting by wheat stem sawfly, average stem cutting in Genou was equivalent to the solid stem check (Rampart or Vanguard) in 6 of 6 environments, less than Neeley in 4 of 6 environments, and less than Morgan in 6 of 6 environments.

On the basis of limited field observations, Genou is moderately susceptible to stem rust (caused by *Puccinia graminis* Pers.:Pers. f. sp. *tritici* Eriks. & E. Henn), and susceptible to leaf rust (caused by *Puccinia triticina* Eriks.), and stripe rust (caused by *Puccinia striiformis* f. sp. *tritici* Westend.). Genou is susceptible to Russian wheat aphid (*Diuraphis noxia* Mordvilko).

Table 2. 2003-2005 Intrastate Winter Wheat Test: Combined Locations Yield, Test Weight and Protein

Cultivar/Line	Grain Yield (bushels/acre)			Test Weight (lb/bu)			Protein (%)		
	2005	2004-2005	2003-2005	2005	2004-2005	2003-2005	2005	2004-2005	2003-2005
location-years	8	16	24	8	16	24	8	16	24
Yellowstone	78.4**	75.9**	75.0**	59.9	60.0	60.0	12.9	13.2	13.5
CDC Falcon	68.4*	67.9	66.7	59.3	59.9	59.9	12.6	12.9	13.2
Rocky	65.6*	65.8	65.8	61.4*	61.4*	61.6	12.5	12.8	13.2
Paul	61.2	63.2	64.4	56.8	57.8	58.2	13.0	13.4	13.6
Jerry	67.3*	67.1	64.3	59.0	59.6	59.7	13.5*	13.5	13.9
Neeley	58.0	62.6	63.7	58.2	59.3	59.7	13.3	13.4	13.7
Morgan	61.5	62.6	62.3	58.7	59.3	59.5	13.0	13.3	13.5
Genou	62.6	62.5	61.9	60.0	60.3	60.5	13.2	13.7	14.0
Tiber	60.7	62.7	61.4	60.0	60.6	60.8	13.5*	13.8	14.1
BigSky	57.6	60.8	60.4	59.1	60.0	60.3	13.6*	13.9*	14.2
Vanguard	63.4	60.5	59.7	60.7*	60.5	60.6	13.5*	14.0*	14.4*
R Rampart	62.7	59.2	57.5	60.9*	60.6	60.7	14.0*	14.4**	14.7**
Norstar	51.9	55.7	55.4	59.5	60.2	60.3	13.1	13.5	13.9
Average	66.6	65.6	64.5	59.6	59.8	60.4	12.9	13.3	13.6
LSD (0.05)	13.0	7.9	5.5	2.5	1.5	1.0	0.7	0.5	0.4
C.V.	34.3	29.9	26.2	4.3	3.6	3.0	5.5	5.4	5.0

R = no Rampart data for 2002, therefore no 4y average.

** = indicates highest value within a column

* = indicates varieties with values equal to highest variety within a column based on Fisher's protected LSD (p=0.05)

Genou was tested at 24 trial locations of the Montana Intrastate (Table 2) and 38 trial locations of the Montana Off-station (Table 3) winter wheat nurseries from 2003 to 2005. In the Intrastate trial, grain yield of Genou averaged 7.6% higher than Rampart and 3.7% higher than Vanguard although within the same statistical grouping. In the Off-station trial, grain yield of Genou was 7.9%* higher than Rampart and 1.7%^{ns} higher than Vanguard. These trials also showed that test weight of Genou was similar to Rampart and Vanguard and higher than that of Neeley and Morgan. Grain protein content of Genou is relatively high but lower than Rampart and Vanguard.

Table 3. 2003-2005 Off-Station Winter Wheat Test: Combined Locations Yield, Test Weight and Protein

Cultivar/Line	Grain Yield (bu/a)			Test Weight (lb/bu)			Protein (%)		
	2005	2004-2005	2003-2005	2005	2004-2005	2003-2005	2005	2004-2005	2003-2005
Location-years	16	26	38	16	25	37	16	25	37
Yellowstone	52.4**	54.9*	56.0**	57.8	58.0	58.3	13.5	13.2	13.0
Neeley	48.2	51.3	52.2	57.9	57.9	58.4	13.6	13.4	13.2
CDC Falcon	47.3	50.5	51.7	58.0	58.5	58.8	13.7	13.1	13.0
Paul	46.4	50.1	51.2	56.3	56.9	57.1	13.8	13.3	13.1
Rocky	46.6	50.0	51.2	59.8*	60.0*	60.2*	13.5	13.2	13.1
Jerry	47.1	50.1	50.5	57.9	58.4	58.5	14.1	13.7	13.3
Genou	46.6	48.3	49.2	58.6	59.0	59.5	13.9	13.5	13.3
Morgan	45.7	48.5	49.2	57.8	58.0	58.4	13.6	13.2	13.0
Tiber	46.5	48.2	48.9	59.1	59.4	59.6	13.7	13.5	13.4
Vanguard	46.5	47.6	48.4	58.9	59.1	59.5	14.5*	14.1*	14.0**
BigSky	45.7	47.4	47.9	58.4	58.7	59.3	14.0	13.8	13.7*
R Rampart	43.1	45.1	45.6	58.6	58.9	59.4	14.6**	14.3**	13.9*
Average	47.1	49.7	50.6	58.3	58.6	59.0	13.9	13.4	13.2
LSD (0.05)	3.6	2.9	2.3	0.8	0.6	0.5	0.5	0.4	0.3
C.V. (%)	11.0	10.6	9.9	2.0	2.0	1.9	4.8	5.0	5.1

+ = new for 2005, R = no Rampart data for 2002, therefore no 4y average

** = indicates highest value within a column

* = indicates varieties with values equal to highest variety within a column based on Fisher's protected LSD (p=0.05)

Milling and bread baking characteristics of Genou were determined from composite grain samples harvested at multiple Montana locations over a 5 year period (2000 to 2004, n=20 location-years). Milling and baking qualities of Genou are similar to those of Rampart.

Brabender Automat flour extraction of Genou (661 g kg^{-1}) was similar to that of Rampart (660 g kg^{-1}), and greater than that of Neeley (642 g kg^{-1}). Flour ash of Genou (3.7 g kg^{-1}) was similar to that of Rampart (3.7 g kg^{-1}) and Neeley (3.7 g kg^{-1}). Genou (723 g kg^{-1}) had similar bake water absorption to Neeley (718 g kg^{-1}) and Rampart (728 g kg^{-1}). Bake mixing time of Genou (8.0 min, n=12) was long, similar to that of Rampart (7.7 min), and longer than that of Neeley (6.1 min). Loaf volume of Genou (1133 cc) was similar to that of Rampart (1129 cc) and greater than that of Neeley (1067 cc).

Table 4. 2002-2005 Intrastate Winter Wheat Test: Havre Yield, Test Weight and Protein

Cultivar/Line	Grain Yield (bushels/acre)				Test Weight (lb/bu)				Protein (%)			
	2005	2004-2005	2003-2005	2002-2005	2005	2004-2005	2003-2005	2002-2005	2005	2004-2005	2003-2005	2002-2005
CDC Falcon	63.7*	65.8*	54.0*	50.2*	60.7	60.4	60.3	59.5	11.4	12.0	13.2	13.5
Yellowstone	59.2	64.5*	53.1*	49.7*	59.5	59.0	59.3	59.2	12.7	13.9	14.5*	14.5*
Rocky	59.8	67.3*	54.1*	49.4*	62.0*	62.0*	61.9*	61.4*	12.2	11.9	12.9	13.2
Genou	62.7*	66.3*	53.7*	48.5*	60.3	59.9	60.3	59.8	12.3	12.9	14.0	14.2
Rampart	59.2	61.9*	52.0*	48.2*	60.3	59.9	60.3	60.0	13.7	14.7	15.1*	15.2**
Vanguard	62.3*	63.5*	52.6*	47.2*	60.8	60.1	60.5	59.9	12.4	13.5	14.2*	14.5*
Paul	58.2	59.9*	51.0	46.7	58.5	58.1	59.1	58.9	13.5	14.1	14.7*	14.6*
Jerry	49.8	54.6	44.9	44.4	59.5	59.1	59.5	59.1	14.0	13.2	14.3*	14.4*
BigSky	47.7	56.7	47.6	43.9	60.2	59.6	60.2	60.3	14.3	14.8	15.2**	15.2
Neeley	50.9	60.1*	46.8	43.7	61.1*	60.0	60.4	59.6	14.0	14.0	14.5*	14.5*
Tiber	48.0	57.3	47.1	43.4	60.9	60.4	60.8	60.8*	12.7	13.5	14.3*	14.5*
Morgan	46.4	51.1	43.0	41.6	58.5	58.4	59.0	58.8	14.3	14.2	15.0*	15.0*
Norstar	47.4	46.9	37.6	38.3	59.3	59.6	60.4	60.3	13.2	13.9	14.9*	14.8*
Average	55.9	60.7	50.5	46.7	60.2	59.7	60.5	60.0	12.9	13.3	14.1	14.2
LSD (0.05)	12.4	9.8	6.5	6.6	1.4	1.6	1.4	1.2	ns	1.1	0.9	
C.V.	12.6	13.8	13.6	17.2	1.3	1.3	1.4	1.4	6.8	4.9	4.7	

** = indicates highest value within a column

* = indicates varieties with values equal to highest variety within a column based on Fisher's protected LSD (p=0.05)

Table 5. 2003-2005 Intrastate Winter Wheat Test: Conrad Yield, Test Weight and Protein

Cultivar/Line	Grain Yield (bushels/acre)				Test Weight (lb/bu)				Protein (%)			
	2005	2004-2005	2003-2005	2002-2005	2005	2004-2005	2003-2005	2002-2005	2005	2004-2005	2003-2005	2002-2005
Yellowstone	92.4*	81.4	78.1**		62.0	61.3	61.4		13.0	12.9	13.0	
Rocky	84.8	79.6	75.5*		64.4	64.1*	64.1*		12.6	11.8	12.5	
CDC Falcon	84.4	78.2	75.1*		63.6	63.7*	63.4		12.7	12.7	12.9	
Paul	87.3	80.8	75.1*		61.8	61.6	61.2		13.3	12.3	12.6	
BigSky	82.9	82.4*	73.3*		62.9	63.0	62.6		13.7	13.0	13.5	
Neeley	82.4	76.4	72.3*		62.2	62.5	62.1		13.2	12.7	13.0	
Genou	86.0	77.3	71.1*		64.5	63.6	62.8		12.3	12.6	13.0	
Morgan	83.4	75.7	71.0*		62.9	62.8	61.9		13.1	12.3	12.8	
Jerry	77.5	76.2	70.4		62.2	62.4	61.8		13.9	13.2	13.5	
Tiber	79.4	73.2	68.2		63.0	62.5	62.3		13.3	13.2	13.6	
Vanguard	72.1	68.6	67.9		62.0	62.4	62.5		14.5	13.6*	13.7*	
Rampart	69.9	64.9	62.5		63.2	62.9	62.5		14.5	14.4**	14.5**	
Norstar	62.8	60.5	55.3		59.7	60.7	59.9		14.5	13.4*	13.9*	
Average	84.3	78.0	72.6		62.7	62.3	62.6		13.3	12.7	13.1	
LSD (0.05)	10.4	9.9	7.7			1.7	1.2			1.1	0.8	
C.V.	7.2	10.8	11.2			1.4	1.2			4.1	3.8	

** = indicates highest value within a column

* = indicates varieties with values equal to highest variety within a column based on Fisher's protected LSD (p=0.05)

Table 6. 2003-2005 Intrastate Winter Wheat Test: Moccasin Yield, Test Weight and Protein

Cultivar/Line	Grain Yield (bushels/acre)			Test Weight (lb/bu)			Protein (%)		
	2005	2004-2005	2003-2005	2005	2004-2005	2003-2005	2005	2004-2005	2003-2005
Yellowstone		2 yr	3 yr		2 yr	3 yr		2 yr	3 yr
	46.5*	53.6**	51.1**	56.2	57.9	56.6	15.5	14.6	14.9
Paul	41.1	48.2*	45.5*	54.0	54.6	53.7	14.9	14.6	15.0
CDC Falcon	39.0	47.1*	45.4*	54.9	56.5	55.9	16.2	15.2	15.4
Jerry	38.8	45.6	44.5	53.6	55.7	55.4	17.9	15.7	15.8
Rocky	37.7	44.2	44.0	57.2	58.4	57.7	15.3	14.3	14.8
Morgan	37.7	44.6	43.0	56.1	57.2	56.8	15.5	14.6	14.5
Neeley	35.2	44.1	42.8	53.5	55.6	55.3	16.6	15.1	15.1
Tiber	35.1	42.6	41.0	55.7	57.1	56.8	16.5	15.3	15.3
Genou	33.9	42.9	40.5	55.5	57.0	55.9	17.2	15.5	16.0
Rampart	34.9	40.4	40.4	56.1	56.2	56.5	18.4	16.2	16.2
BigSky	34.4	42.0	39.0	56.1	57.0	56.2	17.1	15.3	15.7
Vanguard	32.1	37.9	37.6	56.7	56.4	56.2	16.9	15.4	15.8
Norstar	28.5	36.9	35.5	58.2	58.1	57.8	16.3	15.3	15.3
Average	39.0	45.4	44.3	55.9	57.1	56.9	16.2	15.0	15.2
LSD (0.05)	4.2	7.3	6.0	1.8	2.3	1.6	ns	ns	
C.V.	6.4	13.7	14.4	1.6	2.0	1.7	5.0	4.7	

R = no Rampart data for 2002, therefore no 4y average.

** = indicates highest value within a column

* = indicates varieties with values equal to highest variety within a column based on Fisher's protected LSD (p=0.05)

Table 7. 2003-2005 Intrastate Winter Wheat Test: Huntley Yield, Test Weight and Protein

Cultivar/Line	Grain Yield (bushels/acre)			Test Weight (lb/bu)			Protein (%)		
	2005	2004-2005	2003-2005	2005	2004-2005	2003-2005	2005	2004-2005	2003-2005
Yellowstone		2 yr	3 yr		2 yr	3 yr		2 yr	3 yr
	74.2*	43.2	63.2	59.5	59.3	59.7	12.3	13.7	14.2
Paul	69.0	39.9	59.0	59.7	59.7	59.2	10.2	13.3	13.7
Rocky	64.9	35.6	58.4	60.9	59.7	60.8	10.5	14.0	14.0
CDC Falcon	72.6*	41.5	57.9	59.9	59.1	59.1	12.1	14.0	14.0
Neeley	67.8	39.4	56.8	61.5	59.9	60.0	11.1	13.7	14.2
Genou	59.9	35.2	54.5	59.4	60.0	60.9	12.7	15.3	14.9
Morgan	67.8	39.5	52.9	60.8	59.9	59.9	11.5	13.8	13.9
BigSky	57.7	34.2	52.4	60.2	59.9	60.3	11.6	14.4	14.5
Jerry	64.7	36.8	52.0	59.4	59.3	59.9	11.5	14.1	14.1
Tiber	58.7	35.5	50.0	60.4	60.1	61.0	13.4	14.9	14.9
Vanguard	61.4	34.3	48.7	60.1	59.4	60.4	11.8	14.7	15.1
Rampart	57.4	35.0	48.5	60.8	60.8	61.2	11.7	14.1	14.7
Norstar	51.3	31.8	43.0	61.6	61.5	62.0	12.1	13.5	14.1
Average	66.4	38.1	56.0	60.3	59.4	60.3	11.2	14.0	14.1
LSD (0.05)	6.5	ns	ns	1.3	ns	ns		ns	ns
C.V.	6.1	23.9	23.0	1.2	3.3	2.8		7.3	7.7

** = indicates highest value within a column

* = indicates varieties with values equal to highest variety within a column based on Fisher's protected LSD (p=0.05)