

## Request for Support of Registration of BW5135

**Crop Kind:** Spring Wheat

**Type:** Canada Western Red Spring

**Proposer:** A. Carter, C. Briggs, and P. Hucl. Crop Development Centre, University of Saskatchewan, Saskatoon, SK, S7N5A8

**Experimental Designations:** BW5135, W21166

**Pedigree:** W13291/BW965

BW5135 was selected from the cross W13291/BW965 made at the Crop Development Centre (CDC), University of Saskatchewan during the summer of 2015. W13291 is an experimental line developed at the CDC derived from the cross BW781//BW880/BW876. BW781 is a CWRS variety registered as CDC Go, BW880 is a CWRS variety registered as CDC Stanley, and BW876 is an experimental line developed by AAFC-SPARC which was evaluated in the Western Bread Wheat Cooperative test in 2006. BW965 is a CWRS variety developed by AAFC-SPARC which was registered as AAC Viewfield.

The F<sub>1</sub> generation from the cross W13291/BW965 was grown as rows in a field nursery in New Zealand during the winter of 2015/2016. The F<sub>2</sub> generation was grown as a bulk plot in Saskatoon, SK during the summer of 2016. The F<sub>3</sub> generation was grown as a bulk plot in New Zealand during the winter of 2016/2017. The F<sub>4</sub> generation was grown in a space-planted nursery at Saskatoon in 2017 from which individual spikes were selected based on plant type. In 2018, the F<sub>5</sub> generation was grown as hill plots in an irrigated leaf rust and stem rust nursery in Saskatoon, and selections were made based on rust reaction, plant type, and straw strength. In 2019, F<sub>5,6</sub> lines were also grown in hill plots in an irrigated leaf rust and stem rust nursery in Saskatoon and selections were made based on rust reaction, plant type, and straw strength. A bulk harvested F<sub>5,6</sub> hill was used as a seed source for an unreplicated yield trial at Saskatoon in 2020. Selections were made from unreplicated yield trials based on improved grain yield, plant height, straw strength, and kernel characteristics.

In 2021, BW5135 was evaluated as W21166 in a replicated yield trial in Saskatoon to assess agronomic performance. Reactions to leaf rust, stem rust, and stripe rust were assessed in nurseries established near Saskatoon, response to common bunt were assessed in a bunt nursery in Saskatoon, and response to fusarium head blight infection was assessed in Carman, MB. In 2022, W21166 was evaluated in a replicated yield trial grown in six locations (four in SK, one in MB, one in AB). As in 2021, W21166 was grown in leaf rust, stem rust, stripe rust, and fusarium head blight nurseries.

BW5135 was evaluated in the Western Bread Wheat 'C' test from 2023-2025.

**Area of Adaptation:** Spring wheat growing regions of Western Canada.

**Strengths:** BW5135 was higher yielding than CWRS checks grown over three years of testing with earlier maturity. BW5135 had higher grain protein and a shorter plant stature with better lodging tolerance than CWRS checks over three years of testing. BW5135 was noted as an improvement in flour protein relative to checks in all three years, an improvement in falling number in two years, an improvement in flour yield one year and excellent in flour yield one year.

**Weaknesses:** None.

**Description:** BW5135 is a reduced height line with awns and hollow stems. After three years of testing in the Western Bread Wheat "C" Test, BW5135 was 1% higher yielding than AAC Brandon (Table 1; Table 2).

Across three years of testing, BW5135 reached maturity one day earlier than AAC Brandon and had higher grain protein than all check varieties (Table 3). BW5135 was 2 cm shorter than AAC Brandon and had a better lodging score than all checks (Table 3). BW5135 had an equal test weight and smaller kernel size than AAC Brandon (Table 3).

BW5135 was resistant to prevalent races of leaf rust, stem rust, and stripe rust (Table 4). BW5135 showed primarily intermediate resistance to common bunt (Table 4). Most FHB reactions for BW5135 showed intermediate resistance (Table 5). BW5135 carries the *Sm1* gene and is resistant to the orange wheat blossom midge (Table 6). The PRCWRT Disease Evaluation Team supported BW5135 with the following ratings:

Leaf Rust -R  
Stem Rust – R  
Stripe Rust – R  
Common Bunt – I  
Fusarium Head Blight - I

In all three years of quality testing, BW5135 had improvements over checks in flour protein (Table 7). In year three of testing, BW5135 was an improvement over checks in grain protein (Table 7). In years two and three of testing, BW5135 had improvements in falling number (Table 7). In the first and third years of testing, BW5135 had an improvement and was excellent in wheat flour yield (Table 7).

**Breeder seed:** Approximately 250 kg of breeder seed for BW5135 is available through the University of Saskatchewan Crop Development Centre Breeder Seed Facility, Saskatoon, Saskatchewan.

**Table 1.** Grain yield (kg ha<sup>-1</sup>) of BW5135 and check cultivars in the Western Bread Wheat C Registration Test from 2023 to 2025.

Entry	Zone 1 <sup>a</sup>			Zone 2 <sup>a</sup>			Zone 3 <sup>a</sup>			2023-2025
	2023	2024	2025	2023	2024	2025	2023	2024	2025	
Carberry	2855	3000	3136	4396	5040	5189	5637	6781	7777	4837
AAC Brandon	2884	2894	3569	4806	5117	5571	6076	6975	8150	5112
AAC Penhold	2916	2761	3491	4637	5267	5388	6501	7144	8330	5093
Faller	3116	2803	3685	5034	5410	5893	6966	7294	9009	5416
<b>BW5135</b>	<b>2956</b>	<b>2836</b>	<b>3494</b>	<b>4732</b>	<b>5480</b>	<b>5652</b>	<b>6530</b>	<b>6729</b>	<b>7912</b>	<b>5173</b>
CV	5.8	7.0	6.6	6.0	5.2	4.4	3.0	4.0	3.2	4.9
Stations	1	2	2	7	7	8	4	3	1	35
LSD	294	433	401	257	318	277	980	485	472	260

<sup>a</sup>Zone 1 sites: Swift Current (2024, 2025), Stewart Valley; Zone 2 sites: Goodale, Indian Head, Kernen, Lethbridge (2023, 2025), Neapolis, Pense, Scott, Watrous (2024, 2025); Zone 3 sites: Edmonton, Lacombe (2023, 2024), Melfort (2023, 2024), Yorkton (2023).

**Table 2.** Grain yield as percent of AAC Brandon for BW5135 and check cultivars in the Western Bread Wheat C Registration Test from 2023 to 2025.

Entry	Zone 1 <sup>a</sup>			Zone 2 <sup>a</sup>			Zone 3 <sup>a</sup>			2023-2025
	2023	2024	2025	2023	2024	2025	2023	2024	2025	
Carberry	99	104	88	91	98	93	93	97	95	95
AAC Brandon	100	100	100	100	100	100	100	100	100	100
AAC Penhold	101	95	98	96	103	97	107	102	102	100
Faller	108	97	103	105	106	106	115	105	111	106
<b>BW5135</b>	<b>102</b>	<b>98</b>	<b>98</b>	<b>98</b>	<b>107</b>	<b>101</b>	<b>107</b>	<b>96</b>	<b>97</b>	<b>101</b>

<sup>a</sup>Zone 1 sites: Swift Current (2024, 2025), Stewart Valley; Zone 2 sites: Goodale, Indian Head, Kernen, Lethbridge (2023, 2025), Neapolis, Pense, Scott, Watrous (2024, 2025); Zone 3 sites: Edmonton, Lacombe (2023, 2024), Melfort (2023, 2024), Yorkton (2023).

**Table 3.** Average agronomic characteristics of BW5135 and check cultivars from 2023 to 2025 in the Western Bread Wheat C Registration Test.

Entry	Maturity (days)	Height (cm)	Lodging (1-9)	Test weight (kg/hL)	Kernel Weight (g/1000)	NIR Protein (%)
Carberry	98.3	80	2.2	82.0	35.8	14.7
AAC Brandon	98.2	79	2.7	81.7	35.6	14.5
AAC Penhold	97.4	72	2.9	81.3	38.9	13.7
Faller	98.3	82	3.8	80.1	37.3	13.3
<b>BW5135</b>	<b>97.2</b>	<b>77</b>	<b>1.9</b>	<b>81.7</b>	<b>34.1</b>	<b>14.8</b>
CV (%)	1.3	3	2.5	0.9	3.9	14.2
No of Env	35	35	10	35	35	35
LSD	1.2	3	2.1	1.0	2.0	0.4

**Table 4.** Disease reactions of BW5135 and check cultivars to leaf rust, stem rust, stripe rust, and common bunt in the Western Bread Wheat C Registration Test from 2023 to 2025.

Entry	Field Leaf Rust						Field Stem Rust					
	2023		2024		2025		2023		2024		2025	
	Severity	Rating	Severity	Rating	Severity	Rating	Severity	Rating	Severity	Rating	Severity	Rating
Carberry	1.3	R	1.7	R	0.0	R	1	R	1	R	2	R
AAC Brandon	6.0	R	8.3	R	13.3	MR	1	R	1	R	1	R
AAC Penhold	0.0	R	2.3	R	3.3	R	1	R	1	R	1.5	R
Faller	28.3	MR	50.0	MS	51.7	MS	1	R	1	R	3	R
<b>BW5135</b>	<b>0.3</b>	<b>R</b>	<b>0.0</b>	<b>R</b>	<b>0.3</b>	<b>R</b>	<b>1</b>	<b>R</b>	<b>1</b>	<b>R</b>	<b>1</b>	<b>R</b>

**Table 4.** continued

Entry	Stripe Rust						Common Bunt					
	2023		2024		2025		2023		2024		2025	
	Severity	Rating	Severity	Rating	Severity	Rating	Severity	Rating	Severity	Rating	Severity	Rating
Carberry	10	R	17.5	R	28.3	I	2.5	R	10	R	3.5	R
AAC Brandon	55	S	45	MS	36.7	I	11.5	I	28	I	16.5	I
AAC Penhold	40	MS	60	S	70.0	S	1	R	0.5	R	0.5	R
Faller	70	S	90	S	78.3	S	30	S	30	I	49	S
<b>BW5135</b>	<b>0</b>	<b>R</b>	<b>0</b>	<b>R</b>	<b>11.7</b>	<b>R</b>	<b>13</b>	<b>I</b>	<b>32.5</b>	<b>MS</b>	<b>14</b>	<b>I</b>

**Table 5.** Fusarium head blight reactions of BW5135 and check cultivars in the Western Bread Wheat C Registration Test from 2023 to 2025.

Entry	Morden 2023				Carman 2023					Indian Head 2023			Ottawa 2023	
	VRI (%)	VRI Rating	DON (ppm)	DON Rating	VRI (%)	VRI Rating	FDK	DON (ppm)	DON Rating	VRI (%)	FDK	DON (ppm)	VRI (%)	DON (ppm)
Carberry	18.3	I	16.6	I	1.3	MR	1.0	1.0	MR	40.5	22.3	15.8	9.0	37.8
AAC Brandon	24.5	I	11.9	MR	1.8	MR	1.6	0.9	MR	59.6	15.6	10.1	30.0	44.1
AAC Penhold	28.0	I	19.6	I	2.8	MR	4.5	1.9	I	96.7	27.2	26.9	49.0	54.5
Faller	20.2	I	13.0	MR	1.7	MR	1.0	0.7	MR	52.2	25.5	11.5	42.0	40.2
<b>BW5135</b>	<b>25.1</b>	<b>I</b>	<b>26.0</b>	<b>I</b>	<b>2.4</b>	<b>MR</b>	<b>1.9</b>	<b>1.2</b>	<b>I</b>	<b>76.6</b>	<b>26.6</b>	<b>22.1</b>	<b>24.0</b>	<b>28.8</b>

**Table 5.** continued

Entry	Morden 2024				Carman 2024					Indian Head 2024		
	VRI (%)	VRI Rating	DON (ppm)	DON Rating	VRI (%)	VRI Rating	FDK	DON (ppm)	DON Rating	VRI (%)	FDK	DON (ppm)
Carberry	22.3	I	10.2	I	9.0	MR	13.2	4.8	MR	16.2	22.5	22.0
AAC Brandon	24.8	I	11.1	I	12.8	I	19.9	5.1	I	15.1	22.7	23.0
AAC Penhold	35.3	S	10.4	I	7.0	MR	24.7	3.3	MR	30.0	39.5	32.6
Faller	10.8	MR	2.9	MR	6.2	MR	15.7	4.4	MR	5.2	25.2	18.3
<b>BW5135</b>	<b>18.1</b>	<b>I</b>	<b>13.7</b>	<b>I</b>	<b>14.6</b>	<b>I</b>	<b>24.0</b>	<b>6.6</b>	<b>I</b>	<b>8.7</b>	<b>21.3</b>	<b>20.6</b>

**Table 5.** continued

Entry	Morden 2025				Indian Head 2025	
	VRI (%)	VRI Rating	DON (ppm)	DON Rating	VRI (%)	FDK
Carberry	35.1	I	11.8	MR	10.8	28.1
AAC Brandon	43.0	MS	18.2	I	15.2	31.5
AAC Penhold	35.4	I	17.0	MR	39.7	41.4
Faller	27.3	MR	14.2	MR	6.7	30.7
<b>BW5135</b>	<b>40.0</b>	<b>I</b>	<b>21.0</b>	<b>I</b>	<b>22.6</b>	<b>36.2</b>

**Table 6.** Midge damage assessments from spikes collected in midge-infested environments of the Western Bread Wheat C Registration Test (2024-2025).

Entry	2024				2025			
	Resistant	Susceptible	Undamaged	Interpretation	Resistant	Susceptible	Undamaged	Interpretation
Carberry	0	32	28	Susceptible	0	43	47	Susceptible
AAC Brandon	0	25	35	Susceptible	0	51	34	Susceptible
AAC Penhold	0	31	29	Susceptible	0	38	22	Susceptible
Faller	0	31	29	Susceptible	0	20	40	Susceptible
<b>BW5135</b>	<b>28</b>	<b>32</b>	<b>0</b>	<b>Resistant</b>	<b>22</b>	<b>0</b>	<b>38</b>	<b>Resistant</b>

**Table 7.** Quality properties of BW5135 and check cultivars in the Western Bread Wheat C Registration Test from 2023-2025. Flour, dough, and baking tests are based on 74% extraction flour.

Entry	Wheat and Flour Characteristics					Milling Performance		
	Wheat Protein	Flour Protein	Protein Loss	FN	Amylograph Peak	Clean Wheat Flour Yield	Flour Ash	Starch Dmg
<b>2023</b>								
Carberry	14.2	13.4	0.8	368	498	76.8	0.37	7.6
Glenn	14.4	13.7	0.6	362	567	75.5	0.39	8.3
AAC Brandon	14.2	13.5	0.8	330	446	77.5	0.39	7.9
AAC Penhold	13.4	12.6	0.8	369	575	77.1	0.4	7.1
Faller	13.2	12.5	0.7	305	590	78.1	0.37	8.6
Mean of Checks	14.3	13.5	0.7	353	504	76.6	0.38	7.9
<b>BW5135</b>	<b>14.3</b>	<b>13.8</b>	<b>0.5</b>	<b>387</b>	<b>464</b>	<b>77.5</b>	<b>0.39</b>	<b>7.7</b>
<b>2024</b>								
Carberry	14.8	13.8	1.1	408	602	75.5	0.4	7
Glenn	14.7	14	0.7	371	794	75.7	0.38	7.7
AAC Brandon	14.8	13.9	0.9	372	654	76.7	0.39	7
AAC Penhold	13.8	12.7	1.1	447	850	77.2	0.4	6.3
Faller	13.4	12.6	0.8	430	824	77	0.39	7.8
Mean of Checks	14.8	13.9	0.9	384	683	76	0.39	7.2
<b>BW5135</b>	<b>15</b>	<b>14.3</b>	<b>0.6</b>	<b>435</b>	<b>789</b>	<b>76.1</b>	<b>0.4</b>	<b>7.2</b>
<b>2025</b>								
Carberry	14.5	13.7	0.8	371	464	75.7	0.46	8
AAC Hodge	14.1	13.5	0.6	418	916	77.4	0.43	8.6
AAC Brandon	14	13.3	0.7	391	609	77.4	0.42	8.7
AAC Penhold	13.4	12.7	0.6	465	720	76.6	0.46	7.8
Faller	12.8	12.2	0.6	393	757	77.8	0.42	8.9
Mean of Checks	14.2	13.5	0.7	393	663	76.8	0.44	8.4
<b>BW5135</b>	<b>14.5</b>	<b>14</b>	<b>0.6</b>	<b>455</b>	<b>655</b>	<b>77.6</b>	<b>0.45</b>	<b>8.4</b>

Table 7. continued

2023	Dough Properties						Baking Quality				
	Farino Abs	Farino DDT	Farino Stab	EXT Area	EXT Rmax	EXT Length	Lean No Time (LNT) Method				
							Abs	Pk Time	WHR/KG	LV	LTR
Carberry	63	7	10.5	149	618	19.8	72	4.1	11.1	770	0.6
Glenn	64.9	8.5	15.7	171	804	17.9	74	4.4	10.8	823	0.63
AAC Brandon	65.6	7.1	9.9	111	462	19.6	75	3.4	8.9	784	0.48
AAC Penhold	61.8	6.3	15.4	153	829	15.1	71	4.7	11.1	764	0.61
Faller	63.4	6.2	9.6	115	541	17.5	72	3.8	10.7	782	0.61
Mean of Checks	64.5	7.5	12	144	628	19.1	74	4	10.3	792	0.57
<b>BW5135</b>	<b>63.4</b>	<b>7.7</b>	<b>11.6</b>	<b>124</b>	<b>562</b>	<b>18</b>	-	-	-	-	-
<b>2024</b>											
Carberry	63.3	8	9.3	119	463	20.2	72	3.8	9.3	764	0.55
Glenn	64.8	8	14	156	696	18.4	74	4.7	12.1	862	0.62
AAC Brandon	65.3	8.1	11.7	100	420	18.9	74	3.3	8.3	753	0.44
AAC Penhold	61.3	10.1	23.4	132	753	14.4	71	4.6	11.8	761	0.59
Faller	63.4	8.8	16.6	111	507	17.8	74	3.9	9.9	786	0.57
Mean of Checks	64.5	8	11.7	125	526	19.2	73	3.9	9.9	793	0.54
<b>BW5135</b>	<b>63.9</b>	<b>8.2</b>	<b>12</b>	<b>104</b>	<b>472</b>	<b>17.2</b>	<b>73</b>	<b>3.6</b>	<b>9.1</b>	<b>758</b>	<b>0.53</b>
<b>2025</b>											
Carberry	64.9	5.7	5.3	93	366	20.3	74	3.2	8.6	712	0.43
AAC Hodge	64.5	9.2	10.1	145	645	18.6	74	4.3	11.7	785	0.54
AAC Brandon	66.6	7.2	9.1	92	372	19.4	76	3	7.7	751	0.44
AAC Penhold	63.5	7.1	9.5	127	604	17.4	73	3.6	10	737	0.47
Faller	65.5	5.5	7.8	88	369	18.7	75	3.2	8.5	811	0.5
Mean of Checks	65.3	7.4	8.2	110	461	19.4	75	3.5	9.3	749	0.47
<b>BW5135</b>	<b>65.3</b>	<b>5.3</b>	<b>5.8</b>	<b>83</b>	<b>349</b>	<b>18.7</b>	<b>74</b>	<b>2.7</b>	<b>6.9</b>	<b>742</b>	<b>0.43</b>

Table 7. continued

	Water dough colour			
	L*		b*	
	2h	24h	2h	24h
<b>2023</b>				
Carberry	76.2	71.9	25.4	24
Glenn	75.9	71.7	24.4	22.6
AAC Brandon	76.2	72.7	27.1	25.8
AAC Penhold	76.1	68.8	25.7	21.3
Faller	77.2	73.2	20.5	19.4
Mean of Checks	76.1	72.1	25.6	24.1
<b>BW5135</b>	<b>75.7</b>	<b>72</b>	<b>27.8</b>	<b>26.4</b>
<b>2024</b>				
Carberry	76	72.9	24.4	23.7
Glenn	75.4	72.7	24	23.2
AAC Brandon	76.4	73.6	25.8	24.9
AAC Penhold	75.7	69.9	26.5	23.2
Faller	77.2	73.8	20.7	20.2
Mean of Checks	75.9	73.1	24.7	23.9
<b>BW5135</b>	<b>75.5</b>	<b>72.6</b>	<b>27.1</b>	<b>26.1</b>
<b>2025</b>				
Carberry	75.9	72	25.5	24.8
AAC Hodge	75.9	72.3	27.8	26.5
AAC Brandon	76.6	73	25.8	25.1
AAC Penhold	75.3	68.5	25.9	23
Faller	77.8	75	20.2	20.3
Mean of Checks	76.1	72.4	26.4	25.5
<b>BW5135</b>	<b>75.3</b>	<b>72.1</b>	<b>27.5</b>	<b>26.5</b>