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CULTIVAR DESCRIPTION

AAC Redberry hard red spring wheat

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Abstract: AAC Redberry hard red spring wheat (*Triticum aestivum* L.) has a grain yield significantly higher than the check cultivars Katepwa, and Lillian and is similar to Carberry. AAC Redberry matures in a similar number of days as Katewpa and Lillian, and is significantly earlier maturing than Carberry. AAC Redberry has an awned spike, and a low lodging score indicative of strong straw that is significantly lower than Katepwa and Lillian but significantly higher than Carberry. Plant stature is taller than Carberry, but shorter than Lillian and Katepwa. AAC Redberry expressed resistance to prevalent races of leaf rust, stem rust, yellow rust, loose smut, moderate resistance to common bunt and intermediate resistance to Fusarium head blight. AAC Redberry has quality attributes within the range of the check cultivars and is eligible for grades of Canada Western Red Spring wheat.

Key words: Triticum aestivum L., wheat, cultivar description, grain yield, disease resistance, semidwarf.

Résumé : AAC Redberry est une variété de blé rouge vitreux de printemps (*Triticum aestivum* L.) dont le rendement grainier, semblable à celui de Carberry, dépasse passablement celui des cultivars témoins Katepwa et Lillian. AAC Redberry parvient à maturité à peu près en même temps que Katewpa et Lillian, mais est nettement plus précoce que Carberry. La variété se caractérise par un épi barbu et une bonne résistance à la verse en raison d'une paille solide sensiblement plus courte que celles de Katepwa et de Lillian, mais plus haute que celle de Carberry. Le cultivar pousse plus haut que Carberry, mais moins que Lillian et Katepwa. AAC Redberry résiste aux races communes de la rouille des feuilles, de la rouille de la tige, de la rouille jaune et du charbon nu. Elle affiche aussi une résistance moyenne à la carie et une résistance intermédiaire à la brûlure de l'épi causée par *Fusarium*. Les paramètres qualitatifs d'AAC Redberry se situent dans la fourchette des cultivars témoins, ce qui rend la variété admissible à la catégorie « blé roux de printemps de l'Ouest canadien ». [Traduit par la Rédaction]

Mots-clés : Triticum aestivum L., blé, description de cultivar, rendement grainier, résistance à la maladie, demi-nain.

Introduction

AAC Redberry, a hard red spring wheat (*Triticum aestivum* L.) cultivar, was developed at the Swift Current Research and Development Centre (SCRDC), Agriculture and Agri-Food Canada (AAFC), Swift Current, SK. It received registration No. 7921 from the Variety Registration Office, Plant Production Division, Canadian Food Inspection Agency (CFIA), Ottawa, ON, on 19 Feb. 2016. AAC Redberry was granted Plant Breeders' Rights certificate No. 5574 by the Plant Breeders' Rights office, CFIA, on 9 Nov. 2017.

Pedigree and Breeding Methods

AAC Redberry is a doubled haploid (DH) genotype derived from the cross Stettler/Glenn that was made at SCRDC in 2007. The cultivar Stettler (DePauw et al. 2009) derives from a cross of the cultivars Prodigy (Graf et al. 2003) and Superb (Townley-Smith et al. 2010).

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Table 1. Grain yield (kg·ha^{-1}) of AAC Redberry compared with check cultivars and mean of check cultivars in the Western Bread Wheat Cooperative test, 2012–2014.

	Zone 1[a]			Zone 2[a]			Zone 3[a]				
Entry	2012[b]	2013	2014	2012	2013	2014	2012	2013	2014	2013–2014	2012–2014
Katepwa	2845	4486	4453	2825	4172	3359	3689	4667	4118	4025	3716
Lillian	2622	4536	4176	2768	3914	3203	3413	4957	4103	3932	3605
Carberry	2989	4475	4835	2891	4241	3749	4236	5535	4908	4441	4039
Glenn	—	4684	4698	—	4529	3746	—	5352	4692	4482	—
97B64-F9A3[c]	—	4875	4622	—	4935	3714	—	5764	4285	4540	—
Check Mean	2819	4611	4557	2828	4358	3554	3779	5255	4421	4284	3787
AAC Redberry	3064	5063	5037	3344	4750	3967	4737	5837	4724	4718	4363
$LSD_{0.05}$[d]	663	—	—	284	—	—	584	—	—	450	—
$LSD_{0.05}$[e]	—	418	347	—	321	373	—	573	738	—	351
No. of tests	2	2	2	7	7	8	3	3	3	25	37

[a]Zone 1 locations: Swift Current and Stewart Valley; Zone 2 locations: Regina, Goodale, Indian Head, Kernen, Lethbridge (2012, 2014), Scott (2013,2014), Vulcan and Watrous; Zone 3 locations: Lacombe, Melfort, Ellerslie.
[b]Means are based on least squares (LS) means procedure in SAS.
[c]97B64-F9A3 is the pure *Sm1* component of Unity VB.
[d]Appropriate least significant (LSD) to make comparisons of AAC Redberry to Katepwa, Lillian, Carberry. $P \leq 0.05$; includes the appropriate genotype × environment interaction.
[e]Appropriate LSD to make comparisons of AAC Redberry to Katepwa, Lillian, Carberry, Glenn and Unity. $P \leq 0.05$; includes the appropriate genotype × environment interaction.

Table 2. Means[a] for agronomic characteristics of AAC Redberry compared with the check cultivars in the Western Bread Wheat Cooperative test, 2012–2014.

Entry	Maturity (d)	Height (cm)	Lodging score[b] (1–9)	Test weight (kg·hL^{-1})	Kernel weight (mg)	Protein (%)
Katepwa	97.7	105.0	3.5	78.0	32.9	14.5
Lillian	98.2	101.4	3.8	76.9	34.7	15.9
Carberry	101.4	87.1	1.3	79.4	34.5	14.5
Check Mean	99.0	97.8	2.9	78.1	33.8	15.0
AAC Redberry	97.8	94.7	2.3	81.6	35.2	13.9
$LSD_{0.05}$[c]	1.9	2.3	0.7	1.2	1.8	0.4
No. of tests	34	36	19	37	37	37

[a]Means based on LSMEANS procedure in SAS.
[b]Straw strength rated on a scale of 1 to 9, where 1indicates all plants within a plot are erect and 9 indicates all plants in a plot are lying horizontal.
[c]LSD, least significant difference ($P \leq 0.05$) includes the appropriate genotype × environment interaction variation.

The cultivar Glenn (Mergoum et al. 2006) was developed from the cross ND2831/Steele. ND2831 (Mergoum et al. 2005) is a hard red spring experimental line developed by the North Dakota State University breeding program from the cross Sumai 3/Wheaton//Grandin/3/ND688. The parents were haplotyped using the molecular markers associated with Fusarium head blight (FHB) resistance (Bokore et al. 2017). A total of 706 F_1-derived DH lines (B0763&) were generated between summer 2007 and spring 2009 using the maize pollen method (Knox et al. 2000). The '&' was assigned to the cross name to identify lines as DH and incrementing alphabetical characters were assigned for each F_1 plant of the cross followed by a numeric character that indicated the specific DH derivative of an F_1 plant. The DH line, B0763&AB044, was in the second subset of DH lines developed in 2008. In 2008, seed of individual DH lines harvested from greenhouse was inoculated with common bunt [*Tilletia laevis* Kühn in Rabenh., and *Tlletia tritici* (Bjerk.) G. Wint. in Rabenh.] races L16 and T19 in a 1:1 ratio (Hoffmann and Metzger 1976). The seed was planted near Swift Current, SK in 1.5 m long rows spaced 23 cm apart, with every second row planted with CDC Kestrel winter wheat (Fowler 1997), which is susceptible to leaf rust (*Puccinia triticina* Eriks.) and stem rust (*Puccinia graminis* Pers.: Pers. f.sp. *tritici* Eriks. & E. Henn.). An irrigated leaf rust

Table 3. Response to Fusarium head blight and the mycotoxin deoxynivalenol (DON) of AAC Redberry and check cultivars based on the 2012 to 2014 Western Bread Wheat Cooperative test grown in inoculated nurseries near Portage la Prairie, Glenlea, Carman, Morden, MB, Ottawa, ON, and Charlottetown, PE.

	Carman — Inoculated FHB Nursery										Glenlea — Inoculated FHB Nursery						
	2012			2013		2014					2012					2013	
Entry	Index[a] (%)	Rating[b]	FDK[c] (%)	Index[a] (%)	Rating[b]	Index[a] (%)	Rating[b]	FDK (%)	DON[d] (ppm)	ISD[e]	Index[a] (%)	Rating[b]	DON[d] (ppm)	ISD[e]	Rating[b]	1st Rating	2nd Rating
Katepwa	33	I	16	45	MS	13	MR	5	6	5	16	MS	5	18	I	13	17
Lillian	76	S	23	70	S	51	S	9	16	13	11	I	3	17	I	29	31
Carberry	15	MR	4	21	MR	12	MR	6	10	8	11	I	5	17	I	16	16
Glenn	—	—	—	22	MR	6	MR	6	8	6	—	—	—	—	—	24	21
97B64-F9A3[f]	—	—	—	39	I	21	I	9	16	12	—	—	—	—	—	12	15
AAC Redberry	27	I	7	18	MR	5	R	11	8	6	14	I	4	19	I	10	15

	Portage la Prairie		Ottawa					Charlottetown						Morden				
	2013		2012	2013		2014		2012		2013		2014		2014				
Entry	Index[a] (%)	Rating[b]	Index[g]	Index[g]	DON[d] (ppm)	Index[g]	DON[d] (ppm)	Index[a]	DON[d] (ppm)	Index[a]	DON[d] (ppm)	Index[a]	DON[d] (ppm)	Index[a]	Rating[b]	DON[d] (ppm)	ISD[e]	ISD[e] Rating
Katepwa	25	I	50	50	7	67	5	48	1	56	7	30	13	60	S	28	20	R
Lillian	32	S	77	73	10	83	16	54	2	58	9	30	18	60	S	46	31	MR
Carberry	17	I	32	35	10	35	16	45	0	59	13	41	18	33	MR	41	27	MR
Glenn	10	MR	—	30	11	27	9	—	—	51	14	31	18	37	I	40	27	MR
97B64-F9A3[f]	20	I	—	43	9	43	13	—	—	56	12	29	14	63	S	49	33	MR
AAC Redberry	32	S	28	23	9	28	21	48	0	64	13	30	11	35	I	22	16	R
CV	—	—	—	19	—	9	—	—	—	—	—	—	—	—	—	—	—	—
$LSD_{0.05}$[h]	—	—	—	13	—	13	—	7	—	—	6	13	—	—	—	—	—	—

[a]Fusarium head blight disease index = (percentage of infected heads × percentage of diseased florets on infected heads)/100.
[b]Disease response category: R = resistant, MR = moderately resistant, I = intermediate in reaction, MS = moderately susceptible, S = susceptible.
[c]FDK, Fusarium damaged kernels on a weight of kernels with Fusarium symptoms as a percent of the total sample weight.
[d]DON, deoxynivalenol (ppm).
[e]ISD, incidence severity DON index = [(0.2 × incidence) + (0.2 × severity) + (0.6 × DON)].
[f]97B64-F9A3 is pure *Sm1* component of Unity VB.
[g]Percentage of spikes with Fusarium head blight symptoms.
[h]LSD, least significant difference ($P \leq 0.05$).

Table 4. Fusarium damaged kernels and DON of AAC Redberry and checks based on 5 repetitions in the 2014 FHB nursery near Portage la Prairie, MB.

	Fusarium damaged kernels[a] (%)		FHB index[b]		DON (ppm)	
Entry	Mean	Duncan[c] $_{0.05}$	FHB Index	Duncan $_{0.05}$	Mean	Duncan $_{0.05}$
Katepwa	25	d	20	b	17	c
AC Barrie	37	b	17	bc	29	b
Lillian	56	a	42	a	36	a
Carberry	12	f	3	d	9	d
97B64-F9A3[d]	14	ef	8	cd	16	c
AAC Redberry	19	e	6	d	13	cd

Note: DON, deoxynivalenol.
[a]Fusarium damaged kernels as a percentage of total sample weight.
[b]Fusarium head blight (FHB) disease index = (percentage of infected heads × percentage of diseased florets on infected heads)/100.
[c]Duncan's mean separation test ($P \leq 0.05$) using PROC MIXED, SAS, 2003.
[d]97B64-F9A3 is pure *Sm1* component of Unity VB.

and stem rust epiphytotic nursery was established by planting genotypes susceptible to prevalent races of leaf and stem rust in every 12th plot and needle inoculating five plants every 5 m in each row. The leaf rust races used were of representative races found the previous year (McCallum and Seto-Goh 2006). The stem rust races used were QTHJF (C25), RHTSC (C20), RKQSC (C63), RTHJF (C57), TMRTF (C10), and TPMKC (C53) (Fetch et al. 2015; Roelfs and Martens 1988). Two spikes were selected from each of 103 disease-resistant DH lines that matured within a range of acceptable maturity and had strong stems of semidwarf stature. In 2008–2009, seed from each head was grown out in 2-m-long rows near Irwell, New Zealand. From these, 80 DH lines that were comparable with check commercial cultivars for time to maturity, plant height, straw strength, and shattering were selected and harvested as individual rows. In 2009, the 80 DH lines were assessed for agronomic performance by growing them in four row plots (3-m-long) in nurseries near Swift Current and Indian Head, SK, and Morden, MB. Agronomic plots were harvested at maturity and the grain weight of each plot was measured. Seed weight and kernel attributes were measured on the same whole grain sample. Grain protein concentration and volume weight were measured using near infrared reflectance spectroscopy (Williams 1979) on a whole grain of each sample within each location. A subsample was submitted to the Central Quality Lab, Cereal Research Centre, AAFC, Winnipeg, MB to determine end-use suitability for the Canada Western Red Spring (CWRS) market class. Reaction to leaf and stem rust was assessed in an epiphytotic nursery near Glenlea, MB; response to *Fusarium graminearum* Schwabe [teleomorph *Gibberella zeae* (Schwein.) Petch] was assessed in the FHB nursery near Carman, MB; and response to common bunt was assessed in a bunt nursery near Swift Current. Selected DH lines were screened for reaction to a mixture of races T2, T9, T10, and T39 of loose smut [*Ustilago tritici* (Pers.) Rostr.] (Nielsen 1987). The protocols for assessing these diseases are described in Appendix E of the Prairie Recommending Committee for Wheat, Rye and Triticale operating procedures (Anonymous 2020).

The above procedures resulted in the identification of the experimental DH line B0763&AB044, which met all of the selection criteria at each stage of selection. The experimental line was evaluated in the Western Bread Wheat "A_3" test in 2010, in the Western Bread Wheat "B" test in 2011, and as BW966 in the Western Bread Wheat Cooperative (WBWC) test from 2012 to 2014. Annually, the WBWC test consisted of 25 experimental lines and five check commercial cultivars grown in 5 × 6 lattice design with three replications at up to 13 locations per year. The check cultivars were Laura (DePauw et al. 1998) and CDC Kernen (Hucl 2012) in 2012, Glenn (Mergoum et al. 2006) and 97B64-F9A3, the pure *Sm1* component of Unity VB (Fox et al. 2010), for 2013 and 2014, and Katepwa (Campbell and Czarnecki 1987), Carberry (DePauw et al. 2011) and Lillian (DePauw et al. 1998) from 2012 to 2014. Some check cultivars were changed in 2013 to reflect customer requests for a reduced range and increased gluten strength of cultivars eligible for grades of CWRS as part of the Canadian Wheat Class Modernization (Canadian Grain Commission 2015). In 2013, the extensograph instrument was added as a new assay of gluten strength as the farinograph did not adequately differentiate among medium strong gluten genotypes. The agronomic, disease, and end-use suitability variables measured and protocols followed in the WBWC test are described in the operating procedures of the Prairie Recommending Committee for Wheat, Rye and Triticale (Anonymous 2020). The MIXED procedure of SAS® (Littell et al. 2006) was used to perform yearly and multi-year analyses for

Table 5. Reactions and response of AAC Redberry and check cultivars to leaf and stem rust in the 2012 to 2014 Western Bread Wheat Cooperative test grown at various locations.

	Field leaf rust						Field stem rust							
	2012		2013		2014		2012		2013		2014 Brandon		2014 Morden	
Entry	Severity[a]	Rating[a]	Severity	Rating	Severity	Rating	Severity[b]	Response[c]	Severity	Response	Severity	Response	Severity	Response
Katepwa	57	MS	70	S	73	S	2	R	1	R	1	R	1	R
Lillian	5	R	18	MR	3	R	3	R	1	R	1	R	1	R
Carberry	8	R	4	R	1	R	5	R	1	R	15	MR	1	R
Glenn	—	—	25	MR	10	R	—	—	1	R	7	MR	1	R
97B64-F9A3[d]	—	—	22	MR	47	MS	—	—	20	I	3	R	3	MR
AAC Redberry	6	R	1	R	2	R	7	R	5	R	2	R	1	R

[a]Severity is the percentage of leaf area affected by leaf rust; Rating is the descriptive classification of disease resistance/susceptibility based on percent severity, where R (resistant) = 0%–10%, MR (moderately resistant) = 11%–30%, I (intermediate resistance) = 31%–39%, MS (moderately susceptible) = 40%–60%, and S (susceptible) >60%.
[b]Severity is the percentage of the stem infected with stem rust using the Modified Cobb Scale.
[c]Disease response categories reflect the pustule type: R, resistant; MR, moderately resistant; I, intermediate; MS, moderately susceptible; and S, susceptible.
[d]97B64-F9A3 is the pure *Sm1* component of Unity VB.

Table 6. Reactions of AAC Redberry and check cultivars to yellow rust, common bunt, and loose smut in the 2012 to 2014 Western Bread Wheat Cooperative test grown at various locations.

	Yellow rust										Common bunt						Loose smut					
	Lethbridge 2012		Creston 2013		Lethbridge 2013		Creston 2014		Lethbridge 2014		2012		2013		2014		2012		2013		2014	
Entry	Severity[a]	Rating[b]	Severity	Rating	Severity	Rating	Severity	Rating	Severity	Rating	Infection[c]	Reaction[b]	Infection	Reaction	Infection	Reaction	Infection[d]	Reaction[b]	Infection	Reaction	Infection	Reaction
Katepwa	28	MS	45	MS	60	S	45	S	65	S	26	I	11	R	11	MR	8	R	0	R	4	R
Lillian	0	VR	15	R	10	R	5	R	1	R	31	MS	5	R	3	R	15	R	52	I	9	R
Carberry	3	R	15	R	15	R	5	R	5	R	6	R	1	R	16	I	67	MS	8	R	0	R
Glenn	—	—	15	R	15	R	0	S	50	S	—	—	10	R	25	MS	—	—	23	MR	40	I
97B64-F9A3[e]	—	—	15	R	15	R	45	S	75	S	—	—	1	R	2	R	—	—	38	I	29	MR
AAC Redberry	1	VR	15	R	5	R	0	R	5	R	11	MR	2	R	18	I	15	R	15	R	4	R

[a]Severity is the percentage of leaf area affected by yellow rust.
[b]Disease reaction categories: R, resistant; MR, moderately resistant; I, intermediate; MS, moderately susceptible; and S, susceptible.
[c]Percentage of spikes with common bunt symptoms.
[d]Percentage of plants with loose smut symptoms.
[e]97B64-F9A3 is the pure *Sm1* component of Unity VB.

Table 7. End-use suitability[a] analyses, using a 74% extraction flour for all flour testing, of AAC Redberry, check cultivars, and mean of the check cultivars, based on the Western Bread Wheat Cooperative test 2013–2014.

Genotype	Wheat protein (%)	Flour protein (%)	Protein loss (%)	Hagberg Falling No. (s)	Amylograph viscosity (BU)[b]	Clean wheat flour yield (%)	Flour Ash	Flour yield 0.50 ash (%)	Starch damage (megazeme)
Carberry	13.7	12.9	0.9	398	570	75.2	0.40	79.3	7.7
Glenn	13.6	13.0	0.7	368	805	74.6	0.41	78.5	8.9
Lillian	14.5	13.7	0.8	453	640	75.4	0.47	75.8	7.6
97B64-F9A3[c]	13.3	12.5	0.7	460	963	76.7	0.43	77.8	8.4
AAC Redberry	13.5	12.9	0.7	423	600	74.5	0.42	78.0	9.1
SD[d]	0.05	0.05	—	15	5	0.34	0.005	0.34	0.08

[a]American Association of Cereal Chemists methods were followed by the Grain Research Laboratory, Canadian Grain Commission for determining the various end-use suitability traits on a composite of 6 to 10 locations each year.
[b]Amylograph viscosity expressed in Brabender Units (BU).
[c]97B64-F9A3 is the pure *Sm1* component of Unity VB.
[d]SD, standard deviation based on repeated testing of Allis mill check samples, and standard bake flour sample with replicate tests carried out over an extended period of time each season, provided by the Grain Research Laboratory, Canadian Grain Commission.

agronomic data, with years, environments, and their interactions considered as random effects and cultivar treated as a fixed effect. Mean separation tests were performed using Fisher's protected least significant difference least significant difference procedure.

Response to several diseases was assessed in specialized disease nurseries from 2012 to 2014. Stem rust seedling infection types were assessed using races QTHJF (C25), RHTSC (C20), RKQSC (C63), RTHJF (C57), TMRTF (C10), and TPMKC (C53) (Fetch et al. 2021). Leaf rust seedling infection types were assessed using races MBDS (12-3), MBRJ (128-1), MGBJ (74-2), TDBG (06-1-1), and TJBJ (77-2) for 2012 – 14 while race TDBJ (11-180-1) was used in 2012 only (McCallum and Seto-Goh 2006; McCallum et al. 2020). Field evaluations of leaf and stem rust reactions, using leaf rust races representative of those found the previous year and the same stem rust races as for the seedling tests, were measured annually in epiphytotic nurseries near Glenlea, Portage la Prairie, Morden, or Brandon, MB. as described by Bokore et al. (2017). Yellow rust (*Puccinia striiformis f. tritici* Erikss.) was evaluated at Creston, BC, from 2013–2014 and Lethbridge, AB, from 2012–2014 in nurseries exposed to natural infection. Reaction to FHB was assessed in artificially inoculated field tests conducted annually near Glenlea, Portage la Prairie, or Carman, MB, Ottawa, ON, and Charlottetown, PE (Berraies et al. 2020). To determine response to loose smut, a mixture of prevalent races T2, T9, T10, and T39 was injected into florets of plants grown in the field at anthesis and the inoculated seed subsequently grown out and rated in a greenhouse (Menzies et al. 2003). To determine response to common bunt, a mixture of prevalent races L1, L16, T1, T6, T13, and T19 was used to inoculate the seed planted in mid-April of each year near Lethbridge, AB (Gaudet and Puchalski 1989). The race designations are those described by Nielsen (1987) for loose smut and by Hoffmann and Metzger (1976) for common bunt. The protocols for assessing these diseases are described in Appendix E of the Prairie Recommending Committee for Wheat, Rye and Triticale operating procedures (Anonymous 2020).

A sample of grain of BW966 and the check cultivars from each location was submitted to the Canadian Grain Commission each year from 2012 to 2014 to determine grain grade and protein concentration. End-use suitability was determined on a composite sample made up from sites with grain samples representative only of the top hard red spring wheat grades available. The quantity of grain from a location was adjusted to achieve a final composite protein concentration approximating that of the average for the crop that year. A consistent quantity of grain within a location for all experimental lines was used to make up the composite each year. All end-use suitability analyses were performed by personnel at the Grain Research Laboratory, Canadian Grain Commission, Winnipeg, MB following protocols of the American Association of Cereal Chemists (AACC 2000).

Performance and Adaptation

Averaged over 37 trials in 3 yr, AAC Redberry yielded significantly more grain than Katepwa and Lillian and similar to Carberry (Table 1). AAC Redberry matured in a similar number of days as Katewpa and Lillian and was significantly earlier than Carberry (Table 2). Plant height of AAC Redberry was significantly taller than Carberry, but significantly shorter than Lillian and Katepwa. AAC Redberry displayed significantly lower lodging than Katepwa and Lillian but not Carberry (Table 2). AAC Redberry had higher test weight than Carberry, Katepwa, and Lillian (Table 2). The kernel

Table 8. Farinograph, extensograph, and Canadian short process analyses[a], using a 74% extraction flour for all flour testing, of AAC Redberry, control cultivars, and mean of the control cultivars, based on the Western Bread Wheat Cooperative test, 2013–2014.

	Farinograph				Extensograph			Canadian short process (150 ppm ascorbic acid)			
Genotype	Absorption (%)	DDT[b] (min)	MTI[c]	Stability (min)	Area	Rmax	Length	Baking absorption (%)	Mixing time (min)	Mixing energy[d] (W-h kg^{-1})	Loaf volume (cc)
Carberry	65.3	6.6	30.0	10.8	104	417	20	69	5.0	11.1	1033
Glenn	67.1	8.6	17.5	17.8	139	689	17	71	6.0	13.1	1053
Lillian	67.6	5.3	25.0	9.3	80	335	18	72	3.6	7.4	1053
97B64-F9A3[e]	65.7	4.9	27.5	8.0	87	380	18	69	4.3	9.6	1020
AAC Redberry	67.6	5.6	20.0	13.0	102	516	16	72	5.3	11.7	1030
SD[f]	0.2	0.4	2.6	1.4	—	—	—	NA[g]	0.2	0.3	45

[a]American Association of Cereal Chemists methods were followed by the Grain Research Laboratory, Canadian Grain Commission for determining the various end-use suitability traits on a composite of 6–10 locations each year.

[b]DDT, is the farinograph dough development time, measured in minutes.

[c]MTI, is the farinograph mixing tolerance index.

[d]Mixing energy expressed as watts hour per kg.

[e]97B64-F9A3 is pure *Sm1* component of Unity VB.

[f]SD, standard deviation based on repeated testing of Allis mill check samples, and standard bake flour sample with replicate tests carried out over an extended period of time each season, provided by the Grain Research Laboratory, Canadian Grain Commission.

[g]NA, not available.

weight of AAC Redberry was similar to Carberry and Lillian. AAC Redberry had a grain protein concentration less than Lillian and similar to other checks.

AAC Redberry tended to have lower FHB symptoms than Lillian and expressed intermediate resistance (Tables 3 and 4). AAC Redberry expressed resistance to prevalent races of yellow rust, leaf rust, stem rust, and loose smut, and intermediate resistance to common bunt (Tables 5 and 6).

Other Characteristics

Spike: medium glaucosity, parallel sided in profile, medium density, white at maturity, inclined attitude, absent or very sparse hairiness of apical rachis segment.

Lower glume: glabrous with medium width and length.

Lower glume shoulder: broad, elevated shape.

Lower glume beak: medium to short length, slightly curved shape.

Kernel: hard red type.

End-use suitability: in general, AAC Redberry had quality attributes within the range of the check cultivars (Tables 7 and 8). AAC Redberry had a consistently high falling number (Table 7). Dough strength as determined by farinograph and extensograph was consistently higher than Carberry (Table 8). AAC Redberry is eligible for grades of CWRS.

Maintenance and Distribution of Pedigreed Seed

The 62 breeder lines originate from random single plants of the DH line B0763&AB044, which had been grown out as 72 breeder lines in 3-m-long rows in isolation near Swift Current, SK, in 2013 and again as 15 m rows near Indian Head, SK, in 2014. Breeder seed will be maintained by the Seed Increase Unit of the Research Farm, Indian Head, SK S0G 2K0, Canada. The distribution and multiplication of pedigreed seed stocks will be handled through a license to Alliance Seed Corporation, 24th Floor, 333 Main Street, Winnipeg, MB, R3C 4E2, Canada. Phone: 877-270-2890; fax: 204-272-2893; web site: http://www.allianceseed.com/; email: info@allianceseed.com.

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