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CULTIVAR DESCRIPTION

AAC Brandon hard red spring wheat

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Abstract: AAC Brandon hard red spring wheat (*Triticum aestivum* L.) has grain yield and time to maturity within the range of the check cultivars: Katepwa, Laura, Lillian, Carberry, and CDC Kernen. AAC Brandon has an awned spike, a low lodging score indicative of strong straw, and a short plant stature typical of a semidwarf. AAC Brandon expressed resistance to prevalent races of leaf, stem, and stripe rust, and moderate resistance to fusarium head blight and loose smut. Compared with the five Canada Western Red Spring check cultivars, AAC Brandon has improved flour yield and lower flower ash. AAC Brandon is eligible for grades of Canada Western Red Spring.

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

Résumé : La variété de blé roux vitreux de printemps (*Triticum aestivum* L.) AAC Brandon se caractérise par un rendement grainier et une précocité situés dans la plage des cultivars témoins Katepwa, Laura, Lillian, Carberry et CDC Kernen. AAC Brandon produits des épis barbus, possède une paille robuste comme l'indique son faible taux de verse et a le port typique d'une variété semi-courte. Le cultivar résiste aux races courantes de la rouille de la feuille, de la rouille de la tige et de la rouille jaune, et résiste modérément à la brûlure de l'épi causée par Fusarium ainsi qu'au charbon nu. Comparativement aux cinq cultivars de blé roux de printemps de l'Ouest canadien qui ont servi de témoin, AAC Brandon offre un meilleur rendement en farine, laquelle renferme moins de cendres. AAC Brandon est admissible aux classes du 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, semi-court.

Introduction

AAC Brandon, 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), in Swift Current, SK. It received registration No. 7361 from the Variety Registration Office, Plant Production Division, Canadian Food Inspection Agency (CFIA), on 23 Apr. 2013. AAC Brandon was granted Plant Breeders' Rights certificate No. 4958 by the Plant Breeders' Rights office, CFIA on 26 Nov. 2014.

Pedigree and Breeding Methods

AAC Brandon derives from the cross Superb/CDC Osler//ND744 made in 2003 at the SCRDC, AAFC, Swift Current, SK. Superb derives from the cross of Grandin*2/AC Domain (Townley-Smith et al. 2010). CDC Osler derives from the cross AC Cora/PT534 (Hucl 2003). ND744 derives from the cross of ND2831/Parshall// ND706 (Mergoum et al. 2005).

In 2003, about 10 000 F_2 seeds were inoculated with common bunt [*Tilletia laevis* Kühn, and *T. tritici* (Bjerk.) G. Wint. in Rabenh.] races L16 and T19 (Hoffmann and Metzger 1976) and space-planted 15 cm apart in 90 m long rows. The rows were 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 (*P. graminis* Pers.:Pers. f. sp. *tritici* Eriks. & E. Henn.). A leaf rust and stem rust epiphytotic nursery was established by planting genotypes susceptible to prevalent races of leaf and stem rust in every

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fifth spring wheat row and needle inoculating a sample of these plants followed by regular sprinkler irrigation. Representative leaf rust races found the previous year were applied (McCallum and Seto-Goh 2006). Stem rust races used were: QTHST (C25), RHTSK (C20), RKQSR (C63), RTHJT (C57), TMRTK (C10), and TPMKR (C53) (Roelfs and Martens 1988; Fetch 2005). From the disease nursery, 365 disease-free, semidwarf statured, strong strawed, and early maturing F_2 plants were selected, threshed individually, and further selected for kernel characteristics.

The F_3 seeds of 293 F_2 derived individuals were planted as 2 m long head-rows in a contra-season nursery near Lincoln, New Zealand. From these, 121 lines were selected on the basis of time to maturity comparable to check commercial cultivars, plant height, straw strength, shattering, and were harvested as individual rows. The seed of 121 $F_{2:4}$ lines was grown in four-row plots with a harvested area of 2.76 m^2 near Swift Current, Indian Head, and Regina, SK, to assess agronomic performance. Response to fusarium head blight (FHB) was assessed in a specialized nursery near Portage la Prairie, 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 sample of whole grain from 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. Prior to harvest, five spikes were collected from yield trial plots of each F_4 line at Swift Current.

The 28 best families each with four lines per family were grown as the F_5 generation in 2 m long head-rows near Irwell, NZ. The F_5 families were selected on the basis of grain quality and kernel attributes assayed on the grain from the F_4 yield trial. Experimental F_5 lines within acceptable families were selected on the same basis as in the F_3 generation. In the $F_{4:6}$ generation, 69 lines were grown in agronomic trials near Swift Current and Indian Head, SK, and Morden, MB, following a protocol similar to that of the F_4 generation. Five spikes were collected from plots of each F_6 line grown near Swift Current as well as five spikes from plots expressing low FHB symptoms in the FHB nursery near Carman, MB. Samples from harvested plots were measured for grain yield. Grain protein concentration and volume weight of each F_6 line were measured using near-infrared reflectance spectroscopy on a whole grain sample within each location.

Nineteen families of five lines per family, selected from the FHB nursery near Carman, were grown as F_7 head-rows near Irwell, NZ. Families were selected on the basis of grain quality and kernel attributes assayed on grain from the F_6 yield trial. In the $F_{6:8}$ generation, 72 lines were grown in agronomic trials near Swift Current and Indian Head, SK, and Morden, MB. Grain was harvested and processed similarly to grain from F_6 plots. In the F_8 generation, response to FHB was again assessed near Carman, MB. Selected F_8 lines were screened for reaction to a T2, T9, T10, and T39 mixture of races of loose smut [*Ustilago tritici* (Pers.) Rostr.] (Nielsen 1987), and races L16 and T19 of common bunt. In the F_4, F_6, and F_8 generations, response to leaf and stem rust was used as a selection criterion by assessing response to the rusts in an epiphytotic nursery near Glenlea, MB. Throughout this breeding process, the experimental line B0313-CK03Z met all selection criteria at each generation.

B0313-CK03Z was evaluated in the Western Bread Wheat A_2 test in 2008, and entered in the Western Bread Wheat Cooperative (WBWC) tests from 2009 to 2011 as BW932. Annually, the WBWC consisted of 25 experimental lines and five check commercial cultivars grown in a 5×6 lattice design with three replications at up to 13 locations per year. The check cultivars were Carberry (DePauw et al. 2011), Katepwa (Campbell and Czarnecki 1987), Laura (DePauw et al. 1988), Lillian (DePauw et al. 2005), and CDC Kernen (Hucl 2012). The variables measured and protocols followed in the WBWC test were described in the operating procedures of the Prairie Recommending Committee for Wheat, Rye and Triticale (Anonymous 2013; http://www.pgdc.ca/committees_wrt.html). The MIXED procedure of SAS® (Littell et al. 2006; SAS Institute, Inc., Cary, NC) was used to perform yearly and multi-year analyses for agronomic data with years, environments, and their interactions considered random effects and cultivar treated as a fixed effect. Mean separation tests were performed using Fisher's protected LSD procedure.

Response to several diseases was assessed in specialized disease nurseries from 2009 to 2011. Leaf and stem rust seedling infection types were assessed using stem rust races: QTHST (C25), RHTSK (C20), RKQSR (C63), RTHJT (C57), TMRTK (C10), and TPMKR (C53) (Roelfs and Martens 1988; Fetch 2005), and leaf rust races: MBDS (12-3), MBRJ (128-1), MGBJ (74-2), TDBG (06-1-1), TDBJ (70-1), and TJBJ (77-2) (McCallum and Seto-Goh 2006). 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, MB. Reaction to FHB was assessed in artificially inoculated field tests conducted annually near Glenlea and Carman (MB), Ottawa (ON), Lévis (QC), and Charlottetown (PEI) (Gilbert and Woods 2006). To determine the response to loose smut, a mixture of the prevalent races T2, T9, T10, and T39 was injected into florets at anthesis of plants grown in the field and the inoculated seed subsequently grown out and rated in a greenhouse (Menzies et al. 2003). To determine the response to common bunt, a mixture of prevalent races

Table 1. Grain yield of AAC Brandon compared with check cultivars in the Western Bread Wheat Cooperative test[a] 2009–2011.

	Yield (kg ha^{-1})												
	Zone 1[a]				Zone 2				Zone 3				Mean[b]
	2009	2010	2011	Mean	2009	2010	2011	Mean	2009	2010	2011	Mean	2009–2011
Katepwa	3393	3614	3336	3414	3927	3500	4185	3873	6418	5367	5920	5825	4185
Laura	3597	3478	3600	3574	4256	3815	4451	4177	6693	5923	5468	6013	4458
Lillian	3572	3464	3562	3546	4220	3358	4398	4001	6750	5623	6163	6099	4335
Carberry	3945	3362	3401	3611	4183	3661	4576	4142	6427	5889	6205	6133	4462
CDC Kernen	3602	3747	3727	3681	4417	4020	4645	4363	7373	6485	6597	6771	4731
Mean of checks	3622	3533	3525	3565	4201	3671	4451	4111	6732	5857	6071	6168	4434
AAC Brandon	3782	3625	3935	3812	4433	3939	4674	4352	6832	6131	6464	6426	4687
$LSD_{0.05}$[c]	393	384	371	—	283	282	406	—	680	501	578	—	323
No. of trials	2	1	2	5	9	8	8	25	2	3	2	7	37

[a]Locations: Zone 1: Stewart Valley, Swift Current; Zone 2: Beiseker, Goodale, Indian Head, Kernen, Lethbridge, Neapolis, Three Hills, Regina, Scott, Watrous; Zone 3: Edmonton, Lacombe, Melfort.
[b]Means are based on LS Means procedure of SAS.
[c]Least significant difference, $P \leq 0.05$, includes the appropriate genotype × environment interaction variation.

Table 2. Three-year means[a] for agronomic characteristics of AAC Brandon compared with check cultivars in the Western Bread Wheat Cooperative test 2009–2011.

	Maturity (d)	Height (cm)	Lodging[b] (1–9)	Test weight (kg hL^{-1})	Kernel size (mg)	Protein (%)
Katepwa	103.4	96	2.5	78.8	33.7	13.9
Laura	106.5	94	2.8	78.7	33.2	14.2
Lillian	103.6	93	2.1	78.3	36.9	14.8
Carberry	107.5	81	1.2	80.3	36.2	14.2
CDC Kernen	105.7	96	2.1	79.7	36.8	14.3
Mean of checks	105.3	92	2.1	79.2	35.4	14.3
AAC Brandon	107.0	80	1.5	80.1	36.1	13.9
No. of trials	34	38	13	38	38	38
$LSD_{0.05}$[c]	1.5	3.0	0.6	0.6	2.0	0.5

[a]Averages are based on LS Means procedure of SAS.
[b]Straw strength rated on a scale of 1 indicating that all plants in plot are erect to 9 indicating that all plants in a plot are lying horizontal.
[c]Least significant difference, $P \leq 0.05$, includes the appropriate genotype × environment interaction variation.

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 Hoffmann and Metzger (1976) for common bunt.

A sample of grain of BW932 and the check cultivars from each location was submitted to the Canadian Grain Commission 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. 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 (AAAC 2000).

Performance

Averaged over 37 trials in 3 yr, AAC Brandon yielded significantly more than Katepwa and Lillian, and within the range of the other checks (Table 1). AAC Brandon matured within the range of the checks (Table 2). AAC Brandon is a semidwarf genotype with plant height significantly shorter than all of the checks except

Table 3. Reactions of AAC Brandon and check cultivars to leaf and stem rust in the Western Bread Wheat Cooperative test 2009–2011 grown at various locations.

	Field leaf rust						Field stem rust							
	Glenlea						Glenlea				Portage		Winnipeg	
	2009		2010		2011		2009		2010		2011		2011	
	Severity[a] (%)	Rating[a]	Severity (%)	Rating	Severity (%)	Rating	Severity[b] (%)	Disease response[c]	Severity (%)	Disease response	Severity (%)	Disease response	Severity (%)	Disease response
Katepwa	30	MR	70	S	30	I	10	RMR	10	R	5	R	10	MR
Laura	0	R	2	R	0	R	7	RMR	10	R	5	R	10	R
Lillian	3	R	2	R	0	R	10	RMR	10	R	5	R	7	MR
Carberry	0	R	5	R	0	R	10	RMR	10	RMR	5	R	10	MR
CDC Kernen	10	R	8	R	1	R	15	RMR	10	RMR	5	R	1	R
AAC Brandon	0	R	0	R	0	R	5	R	5	R	5	R	5	R
$LSD_{0.05}$[d]	6	—	10	—	—	—	—	—	—	—	—	—	—	—

[a]Severity is the percentage of leaf area affected by rust; Reaction is the descriptive classification of disease based on percent severity: R (resistant) = 0%–10%, MR (moderately resistant) = 11%–30%, I (intermediate resistance) = 31%–39%, MS (moderately susceptible) = 40%–60%, S (susceptible) >60%.
[b]Severity is the percentage of the stem infected with stem rust using the Modified Cobb Scale.
[c]Disease response category: R, resistant; MR, moderately resistant; MS, moderately susceptible; S, susceptible. Ratings such as RMR indicate a range in disease response, in this example, resistant to moderately resistant.
[d]Least significant difference, $P \leq 0.05$, includes the appropriate genotype × environment interaction variation.

Table 4. Reactions of AAC Brandon and check cultivars to yellow rust, common bunt, and loose smut in the Western Bread Wheat Cooperative test 2009–2011 grown at various locations.

	Yellow rust						Common bunt						Loose smut					
	Lethbridge				Creston		Lethbridge						Glenlea					
	2010				2011		2009		2010		2011		2009		2010		2011	
	Severity[a]	Reaction[b]	Severity	Reaction	Severity	Reaction	Infection[c] (%)	Reaction[b]	Infection (%)	Reaction	Infection (%)	Reaction	Infection[d] (%)	Reaction[b]	Infection (%)	Reaction	Infection (%)	Reaction
Katepwa	8	VR	30	I	25	I	23	I	5	RMR	22	I	3	R	8	R	0	R
Laura	2	VR	47	S	5	R	49	S	46	S	40	MS	31	MR	72	MS	29	MR
Lillian	1	VR	2	VR	1	R	4	R	8	RMR	6	MR	30	MR	56	MS	69	MS
Carberry	0	VR	10	R	0	R	1	R	4	RMR	1	MR	17	MR	NA	NA	5	R
CDC Kernen	8	I	47	S	5	R	16	MR/I	25	MS	23	I	0	R	2	R	0	R
AAC Brandon	0	R	6	VR	0	R	3	R	21	MS	47	S	0	R	5	R	11	R
$LSD_{0.05}$[e]	—	—	—	—	—	—	14	—	19	—	10	—	—	—	—	—	—	—

[a]Severity is the percentage of leaf area affected by rust.
[b]Dominant pustule reaction in case of yellow rust and descriptive classification in the case of common bunt and loose smut. Categories: VR, very resistant; R, resistant; MR, moderately resistant; I, intermediate; MS, moderately susceptible; S, susceptible; NA, not available.
[c]Percentage of spikes with common bunt symptoms.
[d]Percentage of plants with loose smut symptoms.
[e]Least significant difference, $P \leq 0.05$, includes the appropriate genotype × environment interaction variation.

Table 5. Response to fusarium head blight (FHB) of AAC Brandon and check cultivars based on the Western Bread Wheat Cooperative test in 2009.

	Fusarium head blight						
	Glenlea		Carman		Ottawa	Lévis	
	Index[a] (%)	Rating[b]	Index (%)	Rating	Score[c] (0–100)	Index (%)	Rating
Katepwa	16	MR	15	I	25	58	MS
Laura	26	I	15	I	27	73	S
Lillian	41	S	53	S	42	75	S
Carberry	15	MR	13	I	22	56	MS
CDC Kernen	11	MR	25	MS	18	53	MS
AAC Brandon	19	MR	14	I	23	62	MS
Mean	23	—	19	—	26	67	—
CV	40	—	28	—	13	14	—
$LSD_{0.05}$[d]	15	—	9	—	6	17	—

[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]Fusarium head blight score based on a scale of 1 (no symptoms of blight) to 100 in which all florets in all spikes are infected with *Fusarium*.
[d]Least significant difference, $P \leq 0.05$, includes the appropriate genotype × environment interaction.

Table 6. Response to fusarium head blight (FHB) of AAC Brandon and check cultivars based on the Western Bread Wheat Cooperative test in 2010.

	Fusarium head blight					
	Glenlea	Carman	Ottawa	Lévis	PEI	
	Index[a] (%)	Index (%)	Score[b] (0–100)	Index (%)	Index (Aug 9) (%)	Index (Aug 12) (%)
Katepwa	13	25	42	6	70	88
Laura	52	19	78	5	90	100
Lillian	65	57	60	7	65	85
Carberry	5	11	36	2	70	90
CDC Kernen	37	28	32	5	48	85
AAC Brandon	5	8	36	4	57	90
Mean	17	24	48	5	67	91
CV	71	25	16	15	—	—
$LSD_{0.05}$[c]	20	10	12	1	24	17

[a]Fusarium head blight disease index = (percentage of infected heads × percentage of diseased florets on infected heads)/100.
[b]Fusarium head blight score based on a scale of 1 (no symptoms of blight) to 100 in which all florets in all spikes are infected with *Fusarium*.
[c]Least significant difference, $P \leq 0.05$, includes the appropriate genotype by environment interaction.

Carberry, which was 1 cm taller. AAC Brandon displayed significantly lower lodging than Katepwa and Laura.

AAC Brandon had higher test weight than Laura, Lillian, and Katepwa. The kernel size of AAC Brandon was within the range of the checks and greater than Katepwa and Laura. AAC Brandon had a grain protein concentration within the range of the checks but lower than Lillian.

AAC Brandon expressed resistance to prevalent races of leaf, stem, and yellow rust, and moderate resistance to loose smut (Tables 3 and 4). AAC Brandon expressed susceptibility to common bunt. AAC Brandon tended to have lower FHB symptoms than Laura or Lillian, and expressed moderate resistance similar to Carberry (Tables 5–7). The deoxynivalenol (DON) content from the inoculated nurseries was similar to Carberry (Tables 8 and 9).

Table 7. Response to fusarium head blight (FHB) of AAC Brandon and check cultivars based on the Western Bread Wheat Cooperative test in 2011.

	Fusarium head blight					
	Glenlea		Ottawa	Lévis	PEI	
	Index[a] (%)	Rating[b]	Score[c] (0–100)	Index (%)	Index (Aug 15) (%)	Index (Aug 19) (%)
Katepwa	16	MS	48	65	28	68
Laura	16	MS	48	79	44	87
Lillian	41	S	73	90	44	83
Carberry	6	MR	22	32	21	44
CDC Kernen	11	I	27	57	23	55
AAC Brandon	5	R	47	45	27	45
Mean	11	—	41	—	52	76
CV	67	—	15	—	—	—
$LSD_{0.05}$[d]	12	—	10	—	11	15

[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]Fusarium head blight score based on a scale of 1 (no symptoms of blight) to 100 in which all florets in all spikes are infected with *Fusarium*.
[d]Least significant difference, $P \leq 0.05$, includes the appropriate genotype by environment interaction.

Table 8. Response to DON of AAC Brandon and check cultivars based on the Western Bread Wheat Cooperative tests in 2009–2011.

	DON[a] (ppm)			ISD[b]			DON (ppm)
	Glenlea			Glenlea			PEI
				Index		Rating[c]	
	2009	2010	2011	2010	2011	2011	2011
Katepwa	16.1	6.4	1.6	4.7	27.2	I	13
Laura	22.9	24.4	4.8	14	24.9	I	35
Lillian	19.9	15.7	10.7	11.1	43.8	S	14
Carberry	18.3	7.5	3.2	4.4	15.3	MR	18
CDC Kernen	9.3	9.3	4.5	7.4	20.8	I	12
AAC Brandon	19	11	2.7	6.1	2.4	I	14

[a]DON, deoxynivalenol.
[b]Incidence severity DON index = [(0.3 × Incidence) + (0.3 × Severity) + (0.4 × DON)].
[c]Response rating based on ISD in 2011. Disease response: R, resistant; MR, moderately resistant; I, intermediate in reaction; MS, moderately susceptible; S, susceptible.

Table 9. Fusarium-damaged kernels and DON of AAC Brandon and checks based on six replicates in the 2011 fusarium head blight nursery near Portage la Prairie, MB.

	Fusarium-damaged kernels[a] (%)		DON[b] (ppm)	
	Mean	$Duncan_{0.05}$[c]	Mean	$Duncan_{0.05}$[c]
AC Barrie	11.7	*abcd*	2.8	*a*
Carberry	9.0	*ab*	2.4	*a*
Katepwa	18.9	*cd*	4.3	*a*
CDC Kernen	15.8	*bc*	6.5	*ab*
AAC Brandon	7.6	*ab*	1.2	*a*

[a]Fusarium-damaged kernels as a percentage of all kernels.
[b]DON, deoxynivalenol.
[c]Duncan's mean separation test ($P \leq 0.05$).

Table 10. End-use suitability[a] for AAC Brandon and check cultivars in the Western Bread Wheat Cooperative tests, 2009–2011.

	Wheat protein (%)	Flour protein (%)	Protein loss (%)	Hagberg Fall No. (s)	Amylograph viscosity (BU)	Flour yield (%)	Flour ash (%)	Flour color (Agtron)	Starch damage (megazeme)	Particle size index
Katepwa	13.6	12.8	0.8	385	460	75.4	0.47	83.4	9.0	53
Laura	13.7	12.7	0.9	388	475	76.4	0.45	89.3	7.5	55
Lillian	14.2	13.5	0.7	432	555	73.9	0.50	84.7	8.4	54
Carberry	13.8	13.0	0.8	362	430	76.7	0.45	84.1	8.5	52
CDC Kernen	13.6	13.0	0.6	412	483	77.7	0.44	87.1	8.5	54
Mean of checks	13.8	13.0	0.8	397	481	76.0	0.46	85.6	8.4	54
AAC Brandon	13.6	12.7	0.9	360	473	77.9	0.42	84.1	9.3	50
SD[b]	0.05	0.05	NA[c]	15	5	0.34	0.005	0.9	0.08	0.9

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

[b]SD is the 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 GRL, CGC.

[c]NA, not available.

Table 11. Farinograph and Canadian short process for AAC Brandon and check cultivars in the Western Bread Wheat Cooperative tests, 2009–2011.

	Farinograph				Canadian short process (150 ppm ascorbic acid)						
	Absorption (%)	DDT[a] (min)	MTI[b]	Stability (min)	Baking absorption (%)	Work (kg h^{-1})	CSP[c] mixing time (min)	Loaf volume (cm^3)	Appearance	Crumb structure	Crumb color
Katepwa	68.8	5.4	20	10.7	68.0	6.2	4.0	1020	7.4	6.0	7.8
Laura	67.6	8.8	13	16.8	67.3	6.6	4.4	1103	7.6	6.0	7.9
Lillian	70.5	5.6	23	10.3	69.7	5.8	4.0	1068	7.5	6.0	7.6
Carberry	67.8	7.3	25	10.0	67.0	7.2	4.9	1077	7.5	6.0	7.8
CDC Kernen	68.7	7.3	22	12.0	68.0	7.3	4.9	1062	7.4	6.2	7.8
Mean of checks	68.6	6.9	20	12.0	68.2	6.6	4.4	1066	7.5	6.0	7.8
AAC Brandon	70.7	8.2	20	12.2	69.0	6.6	4.5	1075	7.7	5.8	7.5
SD[d]	0.2	0.4	2.6	1.4	NA[e]	0.3	0.2	45	NA	NA	NA

[a]DDT is the Farinograph dough development time measured in minutes.

[b]MTI is Farinograph mixing tolerance index expressed in Brabender Units (BU).

[c]Canadian short process.

[d]SD is the 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 GRL, CGC.

[e]NA, not available.

Other Characteristics

Spike: Tapering to parallel sided, medium density, erect to inclined attitude at maturity, medium glaucosity, chaff colour at maturity white with copper striations, medium length awns.

Lower glume: Glabrous with medium width, medium-long length.

Lower glume shoulder: Broad and somewhat elevated with a medium length beak that is slightly curved.

Kernel: Hard red type, medium red colour, medium size, oval to broad elliptical shape, rounded to angular cheek shape, narrow and shallow crease, and medium to long brush hairs.

Germ: Medium to large, round in shape.

End-use suitability: In general, AAC Brandon had quality attributes within the range of the check cultivars (Tables 10 and 11). Relative to the mean of the five checks, AAC Brandon expressed improved flour yield and lower flour ash. AAC Brandon is eligible for grades of CWRS.

Maintenance and Distribution of Pedigreed Seed

The 88 Breeder Lines originate from random $F_{6:10}$ single plants of B0313-CK03Z grown as 108 pre-Breeder Lines in 3 m long rows in isolation near Swift Current in 2010 and again as 15 m rows near Indian Head in 2011. Breeder Seed will be maintained by the Seed Increase Unit of the Research Farm, Indian Head, SK S0G 2K0, Canada. AAC Brandon has been released for distribution and multiplication to by SeCan, 501-300 March Road, Kanata, ON K2K 2E2, Canada.

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