CDC Kinley Spring wheat

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CDC Kinley was selected from the cross HW03007*2/BW356 made at the University of Saskatchewan during the winter of 2005. The initial cross was made during the summer of 2004.

The parental line HW03007 was developed at the Crop Development Centre from the cross Snowbird//Argent*2/AC Elsa. HW03007 was evaluated in the 2004 HWB Test... The parental line BW356 is a hard white wheat line developed by the CRC of AAFC (pedigree = 94B46*2G22/McKenzie) evaluated in the 2003 CBWC and 2044 HWWC tests. BW356 is a Snowstar sibling. The resulting F1 from the cross HW03007*2/BW356 was grown in the field during the summer of 2005 while the F2 and F3 were grown via SSD in the greenhouse during the winter of 2005/2006. The F4 and F5 generations were grown in hills seeded from single spike-sourced seed in a rust nursery during 2006 and 2007, respectively. The F4 and F5 hills were selected on the basis of rust reaction, plant type and straw strength. Seed from the bulked F5 hill was used as a source for entry into an unreplicated yield trial nursery at Saskatoon in 2008. The nursery was subjected to selection for improved yield, height and straw strength. CDC Kinley was evaluated as W09107 in a replicated yield trial at Saskatoon in 2009 and in replicated tests (four trials in SK and one in MB) in 2010 and in the Central Hard White Bread Wheat 'B' test in 211 (as Key#56). CDC Kinley was subsequently evaluated in the Hard White Wheat Cooperative Test from 2012 to 2014 as HW616.

CDC Kinley is adapted to the spring wheat growing regions of Western Canada. CDC Kinley is a white-grained cultivar with a high grain yield potential and high grain protein concentration.

Description:

CDC Kinley is awned and hollow-stemmed. In three years of testing in the Hard White Wheat Cooperative Test, CDC Kinley was approximately 7% higher yielding than Whitehawk and Snowstar (3 year average) and 3.5% higher yielding than AAC Iceberg (2 year average) (Table 1). CDC Kinley was 0.7 to 2 days later maturing than the checks. CDC Kinley was similar in height to Snowstar, 6 cm shorter than Whitehawk and 2 cm taller than AAC Iceberg (Table 1). The lodging scores for CDC Kinley were similar to those of the checks. The test weight of CDC Kinley was higher than that of AAC Iceberg and Whitehawk and slightly lower than that of Snowstar. CDC Kinley had a higher kernel weight than either Whitehawk or Snowstar (4 to 5 mg) but was slightly lighter than AAC Iceberg (0.3 mg) (Table 1). CDC Kinley had a higher grain concentration relative to all the checks (0.4 to 1.1% units).

The FHB Disease Indices for CDC Kinley were intermediate relative to the checks as were the DON levels (Table 2). Kinley had mostly MR or I reactions to prevalent races of leaf, stem and stripe rust (Table 3). Reaction to loose smut and bunt ranged from R to I with the exception of a single 'S' rating for loose smut (Table 3). Leaf spot disease ratings were mostly 'I' (Table 3).

After two years of quality evaluation, CDC Kinley was deemed acceptable for end-use quality for the Canada Western Hard Spring Wheat class, albeit with some flags. After a third year of testing the Canadian Grain Commission deemed CDC Kinley not eligible for inclusion in the CWHWS class due to a lower flour yield than that of the check cultivars (1 to 1.5% lower). CDC Kinley was equal to AC Infinity CWRS wheat in one year of testing (2012). CDC Kinley was assigned to the Special Purpose spring wheat marker class by the Canadian Grain Commission.

CDC Kinley is being released on the basis of its malting quality and baking quality. The malting profile of CDC Kinley offers an advantage over other wheat cultivars as a result of its high FAN levels combined with an intermediate Diastatic Power and high Malt Extract level (Table 4). The baking quality of CDC Kinley was an improvement over the white wheat check cultivars Whitehawk, AAC Iceberg and Snowstar.

Table 1. Agronomic data for CDC Kinleyand check cultivars in the Hard White Wheat Cooperative Test, 2012 to 2014																	
	Yield (kg/ha)			Maturity (days)			Height (cm)			Lodging (1-9)			Test Weight (kg hL^{-1})			Kernel wt (mg)			Grain Protein (%)	
Entry	**2 yr avg**	**3 yr avg**		**2 yr avg**	**3 yr avg**		**2 yr avg**	**3 yr avg**		**2 yr avg**	**3 yr avg**		**2 yr avg**	**3 yr avg**		**2 yr avg**	**3 yr avg**		**2 yr avg**	**3 yr avg**
Whitehawk	5006	4419		97.3	96.1		99.3	97.2		2.0	2.0		79.4	78.9		31.6	30.6		13.4	13.7
AAC Iceberg	5072	-		98.6	-		91.2	-		1.9	-		78.6	-		35.9	-		13.7	-
Snowstar	4938	4423		97.3	96.1		93.3	91.5		1.9	1.9		80.1	79.8		30.6	29.9		13.0	13.3
CDC Kinley	**5254**	**4724**		**99.3**	**98.0**		**93.0**	**91.4**		**1.8**	**1.9**		**79.9**	**79.3**		**35.6**	**34.4**		**14.1**	**14.4**
CV	6.0	6.0		1.4	1.4		2.9	3.3		23.7	22.8		0.8	0.9		3.2	3.2		2.7	2.8
LSD	475	469		1.7	1.5		2.3	3.3		0.6	0.8		1.2	1.1		2.0	1.8		0.4	0.5
Stations	23	35		21	32		23	25		11	17		23	35		23	35		23	35

Table 2. Fusarium Head Blight reaction of CDC Kinley, Hard White Wheat Test (2012-2014).

	2012														
	Ottawa	Glenlea FHB					Carman				PEI			Glenlea	
Entry	Index[T]	Index[S]		DON (ppm)	ISD[R]		Index	Rating[Q]	FDK (%)	DON (ppm)	Index	FDK	DON (ppm)	1st Rating Index	2nd Rating Index
Whitehawk	36	16	MS	5	19	I	33	I	3	-	50	8	2	14	27
AAC Iceberg	-	-	-	-	-	-	-	-	-	-	-	-	-	15	23
Snowstar	45	12	I	2	17	I	48	MS	2	7	54	8	1	7	23
CDC Kinley	**29**	**10**	**MR**	**6**	**17**	**I**	**33**	**I**	**4**	**-**	**50**	**7**	**2**	**15**	**21**

	2013									
	Portage		Ottawa				Carman			
Entry	Index	Rating[P]	Inc.	Sev.	Index	DON (ppm)	Index	Rating[O]	DON (ppm)	ISD
Whitehawk	28	MS	100	43	43	14	15	MR	16	11
AAC Iceberg	20	I	100	48	48	35	22	MR	-	-
Snowstar	12	MR	100	50	50	11	15	MR	6	5
CDC Kinley	**24**	**MS**	**100**	**37**	**37**	**26**	**32**	**I**	**-**	**-**

	2014												
	Morden					Carman							
Entry	Index[Y]	VRI[X]	DON[W]	ISD[V]	ISD Rating	Inc.	Sev.	VRI	Rating[u]	FDK[t]	DON	ISD	Rating[S]
Whitehawk	57	MS	60	39	I	8	4	32	MS	10	13	10	MS
AAC Iceberg	61	S	71	46	I	8	3	23	I	16	21	15	S
Snowstar	74	S	56	37	I	8	5	37	MS	5	10	9	I
CDC Kinley	**64**	**S**	**61**	**40**	**I**	**6**	**2**	**13**	**MR**	**8**	**11**	**8**	**I**

	2014							
	PEI				Ottawa			
Entry	Inc.	Sev.	Index	FDK	Inc.	Sev.	Index	DON
Whitehawk	8	6	53	8	100	56	56	23
AAC Iceberg	9	6	52	9	100	38	38	40
Snowstar	7	5	35	8	100	56	55	12
CDC Kinley	**7**	**5**	**36**	**7**	**100**	**38**	**39**	**20**

Table 3. Rust, bunt, loose smut and leaf spot reactions of CDC Kinley, Hard White Wheat Test (2012-2014).

	Leaf Rust						Field Stem Rust							
	2012		2013		2014		2012		2013		Brandon 2014		Morden 2014	
Entry	**Severity**	**Rating**	**Severity**	**Rating**	**Severity**	**Rating**	**Severity**	**Rating**	**Severity**	**Rating**	**Severity**	**Reaction**	**Severity**	**Reaction**
Whitehawk	40	MS	35	I	SEG		50	S	50	I	3	I	30	I
AAC Iceberg	-	-	17	MR	5	R	-	-	10	MR	5	MR	1	R
Snowstar	38	I	30	I	53	MS	25	MR	60	I	15	MR	20	MR
CDC Kinley	**38**	**I**	**20**	**MR**	**17**	**MR**	**40**	**MS**	**40**	**I**	**10**	**I**	**5**	**I**

	Stripe Rust								
	Lethbridge 2012		Creston 2013		Lethbridge 2013		Creston 2014	Lethbridge 2014	
Entry	**Severity**	**Reaction**	**Severity**	**Reaction**	**Severity**	**Reaction**	**Severity**	**Severity**	**Reaction**
Whitehawk	30	MS	45	MS	70	S	0	35	I
AAC Iceberg	-	-	25	MR	5	R	5	15	MR
Snowstar	40	S	85	S	50	S	15	80	S
CDC Kinley	**10**	**I**	**25**	**MR**	**20**	**MR**	**0**	**35**	**I**

	Bunt						Loose Smut					
	2012		2013		2014		2012		2013		2014	
Entry	**Mean**	**Class**	**Mean**	**Class**	**Mean**	**Class**	**% Infection**	**Rating**	**% Infection**	**Rating**	**% Infection**	**Rating[Q]**
Whitehawk	29	MS	35	S	27	MS	65	MS	6	R	17.6	MR
AAC Iceberg	-	-	26	I	6	MR	-	-	0	R	11.1	MR
Snowstar	45	S	45	S	30	S	58	MS	31	MR	8.0	R
CDC Kinley	**19**	**I**	**5**	**R**	**1**	**R**	**91**	**S**	**5**	**R**	**14.6**	**MR**

	Leaf Spot 2012						Leaf Spot 2013				Leaf Spot 2014			
	Melfort		Swift Current		Glenlea		Swift Current		Melfort		Swift Current		Melfort	
Entry	**Rating**	**Class**	**Rating**	**Class**	**Rating**	**Class**	**Severity**	**Rating**	**Severity**	**Rating**	**Sev.**	**Rating**	**Severity**	**Rating**
Whitehawk	8.3	MS	7.8	I	15.1	I	7.5	I	9.0	MS	7.3	I	8.0	I
AAC Iceberg	-	-	-	-	-	-	8.8	MS	9.7	S	8.0	I	9.3	MS
Snowstar	8.7	MS	8.0	I	3.9	R	7.8	I	7.7	I	7.5	I	8.7	MS
CDC Kinley	**7.0**	**I**	**8.0**	**I**	**4.2**	**R**	**8.5**	**MS**	**7.0**	**I**	**7.8**	**I**	**8.0**	**I**

Table 4. Malt quality profile of CDC Kinley compared to other spring wheat cultivars as well as malt and feed barley cultivars (courtesy of the Malt Barley Breeding Program (Dr. A. Beattie and staff). Mean of two biological replicationS per cultivar.

Name	Market Class	DP [DU]	alpha amylase [DU]	FAN [ppm N]	Beta-glucan [ppm]	Soluble Protein [%]	70°C Extract [%]	Friability [%]
CDC Kinley	SP	66.16	53.8	178	65	3.8	80.5	14.2
Snowstar	CWHWS	62.47	45.7	97	69	2.4	78.2	11.9
AAC Iceberg	CWHWS	68.31	53.7	113	68	3.0	80.4	11.4
CDC Whitewood	CWHWS	52.66	47.0	133	60	3.3	82.8	11.9
AC Andrew	CWSWS	54.33	57.5	145	62	3.3	83.1	33.6
Pasteur	SP	66.86	57.6	111	56	2.8	80.0	11.0
5702PR	CPSR	57.78	57.6	106	50	3.1	79.4	14.8
AAC Conquer	CPSR	63.21	59.5	126	70	3.7	80.2	20.0
AAC Ryley	CPSR	52.86	52.5	144	63	3.2	79.6	13.4
Carberry	CWRS	75.17	65.0	135	60	3.7	78.1	11.7
Glenn	CWRS	69.20	55.6	119	75	3.0	76.2	6.6
Unity	CWRS	76.05	63.1	113	49	2.5	79.9	7.9
AAC Brandon	CWRS	54.33	67.1	123	48	3.3	78.7	11.1
CDC Plentiful	CWRS	78.39	58.6	103	54	3.2	76.5	10.5
CDC Stanley	CWRS	68.71	51.6	99	59	2.3	78.0	8.4
CDC Titanium	CWRS	73.75	63.0	131	47	3.6	75.0	9.2
CDC Utmost	CWRS	47.11	52.6	126	66	3.0	76.3	10.7
AC Metcalfe	Malting barley	59.79	94.8	204	218	3.3	80.6	67.2
CDC Copeland	Malting barley	50.29	73.4	139	514	2.5	81.0	71.7
CDC Kindersley	Malting barley	58.43	79.6	200	35	3.4	86.7	68.8
CDC Meredith	Malting barley	50.49	60.2	144	532	2.4	82.8	56.7
CDC Austenson	Feed barley	48.25	64.4	128	1226	1.5	81.3	50.5
CDC McGwire	Hulless Feed barley	54.06	64.3	115	1077	2.0	85.5	29.3

DP = Diastatic Power

FAN = Free Amino Nitrogen