CULTIVAR DESCRIPTION

KANE hard red spring wheat

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Key words: *Triticum aestivum* L., cultivar description, red spring wheat, test weight, preharvest sprouting, leaf rust

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Mots clés: *Triticum aestivum* L., description de cultivar, blé roux de printemps, poids spécifique, germination sur pied, rouille de la tige

KANE is a high test weight, preharvest sprouting resistant, leaf rust resistant hard red spring wheat (*Triticum aestivum* L.). It was developed by Agriculture and Agri-Food Canada (AAFC), Cereal Research Centre, Winnipeg, Manitoba, and registered in 2006. KANE was given the registration number 6165 by the Plant Variety Registration Office, Plant Production Division, Seed Section, Canadian Food Inspection Agency, Agriculture and Agri-Food Canada, on 2006 Jul. 25.

KANE is adapted to the wheat-producing regions of Manitoba and eastern Saskatchewan and meets the kernel shape, kernel colour and end-use quality characteristics of the Canada Western Red Spring (CWRS) wheat market class. The name KANE is that of a small village in Manitoba.

Pedigree and Breeding Method

KANE was selected from the cross AC Domain/McKenzie made in 1996 at the Agriculture and Agri-Food Canada Cereal Research Centre, Winnipeg (Table 1). AC Domain derives from the cross BW83/ND585 (T.F. Townley-Smith, submitted C.J.P.S.) and McKenzie derives from the cross Columbus/Amidon (Graf et al. 2003). F_2 plants were selected for resistance to leaf and stem rust caused by *Puccinia triticina* Eriks. and *P. graminis* Pers.:Pers. f. sp. *tritici* Eriks. & E. Henn., respectively, and shorter straw. F_3 hills and F_5

and F_7 head rows were grown in New Zealand winter nurseries where screening for agronomics and leaf rust resistance occurred. Head rows were selected for agronomic traits and disease resistance, including leaf and stem rust, glume blotch caused by *Stagonospora nodorum* (Berk.) E. Castell. & Germano [teleomorph *Phaeosphaeria nodorum* (E. Müll.) Hedjar.], common bunt caused by *Tilletia tritici* (Bjerk.) R. Wolff and *T. laevis* Kuhn in Rabenh., and black point and in $F_{3:4}$ near Glenlea, MB. $F_{3:6}$ and $F_{6:8}$ derived lines were tested for grain yield using single replicate tests at four locations in Manitoba and Saskatchewan. Derived from this population, the line 96B72-Z4A was tested in the preregistration tests CBWA1 and CBWB in 2001 and 2002, respectively, before being entered into the Central Bread Wheat Cooperative (CBWC) registration test in 2003, designated as BW342.

In the CBWC, agronomic performance was evaluated using a 3-replicate rectangular lattice, 30 entry yield test grown at 10 locations (Manitoba: Glenlea, Portage La Prairie, Souris, Morden, Brandon; Saskatchewan: Regina, Indian Head, Kelvington, Saskatoon, Melfort) operated by Agriculture and Agri-Food Canada (AAFC), Agricore United, and the University of Saskatchewan. At the Cereal Research Centre, disease severity in artificially inoculated field nurseries was estimated for leaf rust and stem rust using the modified Cobb scale (Peterson et al. 1948). Several greenhouse seedling evaluations were conducted to observe infection type reactions to *P. triticina* races MBDS (12-3), MGBJ (74-2), TJBJ (77-2) and MBRJ (128-1) (McCallum and Seto-Goh 2006) and to *P. graminis* f. sp. *tritici* races TMRTK (C10), RKQSR (C63), TPMKR (C53) RTHJT (C57), QTHST (C25) and RHTSK (C20) (Fetch 2005; Roelfs and Martens 1988). Fusarium head blight caused by *Fusarium graminearum* Schwabe [teleomorph *Gibberella zeae* (Schwein.) Petch] was evaluated in a field nursery spray inoculated with a macroconidial suspension and evaluated using a visual index (% incidence x % severity/100) (Gilbert and Woods 2006). Resistance to the disease loose smut caused by *Ustilago tritici* (Pers.) Rostr. was also estimated (Menzies et al. 2003). Evaluations for common bunt resistance (Gaudet and Puchalski 1989; Gaudet et al. 1993) were conducted at the Lethbridge Research Centre of AAFC. End-use quality was evaluated by the Grain Research Laboratory, Canadian Grain Commission, Winnipeg, MB, using American Association of Cereal Chemists methods. Annual statistical analysis of experiments was conducted using Agrobase Generation II (Agronomix Inc. 2006). The SAS PROC MIXED procedure (SAS Institute, Inc. 2006) was used to perform a multiyear analysis: for agronomic data, a mixed model was used with environments and replications set as random variables and cultivars set as a fixed variable. For end-use quality data, the analysis was similar except that there were no replicated observations within years.

Breeder Seed of KANE was produced by randomly selecting 250 F_6-derived F_{11} spikes from a rogued BW342 seed increase plot in 2003. Of these spikes, 28 were discarded due to seed being shrivelled, due to dry growing conditions in 2003. The remaining 222 spikes were grown as an isolated group of 1-m rows at Portage la Prairie, MB in 2004 where 24 lines were discarded (5 lines did not grow, 13 lines contained awnletted plants, 4 lines lacked stem anthocyanin coloration, 2 lines had atypical seed appearance) and 198 lines were retained. These lines were grown as 1 m × 6 m plots at Lincoln, New Zealand in 2005–2006 with 17 lines discarded because they contained offtypes (presence of awnletted or tall plants). The remaining 181 uniform lines were inspected by AgriQuality National Seed Laboratory, Palmerston North, New Zealand and bulk harvested to produce 340 kg of breeder seed. A second breeder seed plot was grown in 2006 at Indian Head, SK consisting of 177 rows of which 13 were discarded because they contained offtypes. Four lines were not grown due to lack of seed. Two kinds of off-type plants were rogued from the plot with the following frequencies: tall plants (1:2777) and tip-awned plants (1:5525).

Performance

The overall mean grain yield of KANE was similar to the high yielding checks McKenzie and Superb in 3 yr of testing in the Central Bread Wheat Cooperative test (Table 2). KANE exhibited maturity not significantly different than McKenzie, AC Barrie and Superb but was significantly later than Katepwa and CDC Teal (Table 3). KANE was significantly taller than Superb but was significantly shorter than the other checks. KANE has similar lodging scores to CDC Teal, AC Barrie and Superb but had significantly stronger straw than Katepwa and McKenzie. KANE showed a significantly higher test weight than all of the checks and had a kernel weight similar to the checks except Superb which was significantly larger (Table 3).

KANE is resistant to the prevalent races of leaf and stem rust; however, resistance was intermediate to susceptible for common bunt, and was moderately susceptible to loose smut (Table 4). KANE has intermediate resistance to fusarium head blight, expressing a reaction similar to AC Barrie. Considering both the field leaf rust reaction and presence of a molecular marker developed by J. Thomas (unpublished data) based on a DNA sequence linked to *Lr21* (Huang et al. 2003), KANE has the leaf rust resistance gene *Lr21*, derived from McKenzie. Since both AC Domain and McKenzie have been shown to contain the leaf rust gene *Lr16* (Lui and Kolmer 1997; McCartney et al. 2005), KANE should have this gene also. The marker for the adult plant leaf rust resistance gene *Lr34* (Lagudah et al. 2006) is also present in KANE (S. L. Fox, unpublished data); genetic studies will be required to confirm the presence of this gene in KANE.

Assessments of preharvest sprouting resistance by exposure of spikes in a rain simulator and field weathering (Humphreys and Noll 2002) demonstrated that KANE tolerated weathering and maintained falling number (Table 5). KANE sprouted less frequently than any of the check cultivars in three of five comparisons. Overall, KANE sprouted similarly to McKenzie and Superb and significantly less than Katepwa, CDC Teal and AC Barrie.

The end-use quality of KANE was deemed suitable for the CWRS class, exhibiting an advantage of about 0.7%

Table 1. Population size and activities at each generation leading to the registration of KANE hard red spring wheat

Name	Gen.	Year	Activity – Locations
	F_0	1996	Cross was made in a growth cabinet.
96B72	F_1	1996	F_1 plants grown a field nursery near Glenlea, MB.
96B72	F_2	1997	Approximately 4000 seeds planted near Glenlea in 16 plots seeded at rate of approximately 100 seeds m^{-2}. Selection of spikes based on agronomic appearance and resistance to leaf and stem rust.
96B72_Z	$F_{2:3}$	1997	250 hills (estimated) in a New Zealand winter nursery. Selection for agronomics and leaf rust resistance. Selected 4 spikes per selected hill.
96B72-Z4	$F_{3:4}$	1998	551 lines in a 1-m row nursery near Glenlea. Selection for agronomics, seed appearance, resistance to rusts and common bunt, protein concentration, flour yield, and dough strength measured by mixograph.
96B72-Z4	$F_{3:5}$	1998	210 lines in a New Zealand winter nursery, 1.5-m row. Selection for agronomics and leaf rust resistance.
96B72-Z4	$F_{3:6}$	1999	60 lines in yield test, single replicate at four locations (MB: Brandon, Glenlea, Morden, Portage la Prairie). Based on agronomics, disease resistance and quality, five spikes were selected per selected entry.
96B72-Z4A	$F_{6:7}$	1999	100 lines in a New Zealand winter nursery, 1.5-m row. Selection for agronomics and leaf rust resistance.
96B72-Z4A	$F_{6:8}$	2000	71 lines in yield test, single replicate at four locations (MB: Glenlea, Brandon, Morden; SK: Melfort). Selections based on agronomics, disease resistance and quality performance.
96B72-Z4A	$F_{6:9}$	2001	11 lines in the Central Bread Wheat "A" test. Yield test, two replicates at five locations (MB: Glenlea, Brandon: SK: Indian Head, Regina and Melfort).
96B72-Z4A	$F_{6:10}$	2002	Four lines in the Central Bread Wheat "B" test. Yield test, three replicates at eight locations (MB: Glenlea, Brandon, Morden; SK: Indian Head, Regina, Melfort, Saskatoon).
BW342	F_{11}-F_{13}	2003-5	Central Bread Wheat "C" registration test. Yield test, three replicates at 10 locations (MB: Glenlea, Portage la Prairie, Brandon, Morden, Souris; SK: Indian Head, Regina, Melfort, Kelvington, Saskatoon).
BW342	F_{11}	2003	Breeder seed spikes: 250 random spikes were selected from a rogued increase plot grown at Indian Head, SK. Twenty-eight spikes were discarded due to shrivelled seed.
Breeder Seed Production			
BW342	F_{12}	2004	Breeder seed isolation rows: 222 lines were grown in 1 m rows grown at Portage La Prairie with 10 m isolation distance from any other wheat. Of these lines, 198 were selected.
BW342	F_{13}	2005	Breeder seed plots: 1×6 m^2 plots grown at Lincoln, NZ with 10 m isolation distance from other wheat. Seventeen lines were discarded due to lack of uniformity leaving 181 lines that were harvested in bulk.
BW342	F_{13}	2006	Breeder seed rows: 15-m rows grown at Indian Head, SK with 10-m isolation distance from other wheat. One-hundred and seventy-seven lines grown with 13 discarded due to lack of uniformity leaving 164 lines that were harvested in bulk.

Table 2. Yield (kg ha^{-1}) of KANE and check cultivars in the Central Bread Wheat Coop, 2003-2005

	Manitoba[z]				Saskatchewan				All Sites			
Cultivar	2003	2004	2005	Mean	2003	2004	2005	Mean	2003	2004	2005	Mean
Katepwa	4049	4497	3476	4089	3219	5537	3933	4077	3680	4887	3761	4098
McKenzie	4522	5085	4173	4656	3500	6143	4252	4470	4067	5482	4222	4576
CDC Teal	4137	5030	3707	4381	3052	5404	4263	4097	3655	5170	4054	4276
AC Barrie	4071	4796	3357	4185	3207	5506	4112	4127	3687	5062	3829	4178
Superb	4537	5125	3591	4545	3373	5804	4469	4386	4020	5379	4140	4496
KANE	4485	5426	4034	4743	3304	5382	4144	4134	3960	5409	4103	4479
LSD ($P = 0.05$)[y]	361	617	503	328	282	536	258	314	227	451	273	203
No. of tests	5	5	3	13	4	3	5	12	9	8	8	25

[z]Manitoba test locations: Glenlea, Portage la Prairie, Brandon, Morden, Souris; Saskatchewan test locations: Indian Head, Regina, Melfort, Kelvington, Saskatoon.
[y]LSD of means was based on the checks and KANE and calculated using the SAS PROC MIXED procedure (SAS Institute, Inc. 2006)

higher flour extraction than the best checks (Table 6). The milling and baking performance of this cultivar was similar to the check cultivars.

Other Characteristics

The observations of plant characteristics were made using an experiment grown in 2005 at Portage La Prairie, MB, for collection of data required for Plant Breeders Rights application. This trial was grown as a four replicate, randomized complete block experiment using 3.25 m^2 plots seeded at 250–300 seeds m^{-2}.

Seedling Characteristics

Coleoptile colour. Green. No anthocyanin colouration.
Juvenile growth habit. Semi-erect.
Seedling leaves. Slightly pubescent leaf sheaths and glabrous blades of lower leaves.

Adult Plant Characteristics

Growth habit. Erect to semi-erect.
Leaves. Moderately recurved.
Flag leaf. Dark green with glabrous sheath and blade. The auricle colouration is absent and with auricle margins being slightly pubescent. Leaf sheath has a slightly waxy bloom.

Table 3. Summary of agronomic traits of KANE and check cultivars in the Central Bread Wheat Coop, 2003–2005

	Maturity (d)				Height (cm)				Lodging[z] (1–9 scale)				Test weight (kg hL^{-1})				Kernel weight (mg kernel^{-1})			
Cultivar	2003	2004	2005	Mean	2003	2004	2005	Mean	2003	2004	2005	Mean	2003	2004	2005	Mean	2003	2004	2005	Mean
Katepwa	85.2	109.8	100.6	98.7	90	101	97	96	2.4	3.6	2.7	2.5	78.0	75.9	76.3	76.7	30.8	33.6	32.3	32.2
McKenzie	85.5	111.4	102.9	100.1	87	97	97	94	2.5	3.3	3.5	2.8	78.8	78.1	78.0	78.3	31.3	33.3	32.5	32.4
CDC Teal	85.9	111.3	102.0	99.9	86	94	92	91	1.9	2.7	2.2	1.8	77.3	76.5	77.4	77.0	31.1	35.3	33.2	33.1
AC Barrie	86.0	112.8	103.0	100.8	88	96	95	93	1.9	2.2	2.5	1.8	78.7	77.1	78.2	78.0	32.7	35.4	33.3	33.8
Superb	87.4	117.0	104.7	103.2	83	90	86	86	1.7	1.5	2.3	1.3	78.6	76.5	78.1	77.7	36.7	37.5	34.9	36.3
KANE	86.7	113.8	104.2	101.8	82	92	90	88	1.7	2.1	2.5	1.7	80.1	78.7	79.3	79.4	32.7	35.4	32.8	33.6
LSD (P = 0.05)	1.1	1.8	1.8	1.8	3	2	2	2	1.0	0.8	1.0	0.8	0.8	1.0	0.7	0.8	1.3	1.9	1.5	1.5
No. of tests	9	8	9	26	9	8	9	26	2	7	5	14	9	8	9	26	9	8	9	26

[z]Lodging scale: 1 = vertical, 9 = flat.

Table 4. Disease severities and reactions[z] of KANE and check cultivars in the Central Bread Wheat Coop, 2003–2005

	Stem rust[y] (% severity, reaction)			Leaf rust[x] (% severity, reaction)			Fusarium head blight index[w] (% incidence × % severity/100, reaction)				Loose smut[v] (% infection, reaction)			Common bunt[u] (% infection, reaction)		
Cultivar	2003	2004	2005	2003	2004	2005	2003 Glenlea	2003 Carman	2004 Glenlea	2005 Glenlea	2003	2004	2005	2003	2004	2005
Katepwa	15 RMR	3 R	15 MRMS	48 MRS	45 MSS	65 S	26 I	29 I	29 MS	25 MS	10 R	11 MR	16 MR	3 R	32 I	40 I
McKenzie	20 RMR	5 RMR	10 RMR	0 R	0 R	1 R	28 I	22 I	43 S	38 S	56 MR	30 MR	58 MS	1 VR	2 R	5 MR
CDC Teal	25 MRMS	15 MR	15 MRMS	16 MRMS	7 MR	29 MR	67 S	68 S	76 S	63 S	30 MR	19 MR	25 MR	9 I	70 S	36 I
AC Barrie	30 MRMS	15 MR	10 MRMS	57 MRMS	40 MRMS	55 MS	29 I	32 I	23 I	20 I	29 MR	48 I	43 I	11 I	46 S	28 I
Superb	5 R	trace R	17 MR	47 MRS	13 MR	78 S	42 S	39 MS	43 S	12 MR	54 S	36 I	40 I	8 I	29 I	14 MR
KANE	7R	trace R	7 RMR	0 R	0 R	5 R	10 MR	19 MR	36 S	19 I	2 R	25 MR	70 MS	1 R	68 S	42 I

[z]Disease reaction class: VR = very resistant, R = resistant, RMR = resistant to moderately resistant, MR = moderately resistant; I = intermediate reaction; MRMS = moderately resistant to moderately susceptible, MSS = moderately susceptible to susceptible, S = susceptible.
[y]Caused by *Puccinia graminis* Pers.:Pers. f. sp. *tritici* Eriks. E. Henn. Races used include TMRTK, RKQSR, TPMKR, QTHST, RHTSK and MCCFR.
[x]Caused by *P. triticina* Eriks. Inoculum was a composite of all leaf rust disease survey collections made the previous year from Manitoba and Saskatchewan (McCallum and Seto-Goh, 2006).
[w] Caused by *Fusarium graminearum* Schwabe (teleomorph *Gibberella zeae* (Schwein.) Petch). Fusarium head blight index = (% infected spikelets × % infected spikes)/100.
[v]Caused by *Ustilago tritici* (Pers.) Rostr. Races used include T2, T9, T10 and T39. Rating based on previous and current tests after artificial inoculation.
[u]Caused by *Tilletia tritici* (Bjerk.) R. Wolff and *T. laevis* Kuhn in Rabenh. The inoculum used was a composite of races T-1, T-6, T-13, and T-19 of *T. tritici* and L-7 and L-16 of *T. laevis* mixed in a 1:1:1:1:2:2 ratio (vol/vol).

Table 5. Falling numbers and sprouting scores of KANE and the check cultivars from yield tests grown in 2001–2005

	Falling number (s)								Sprouting score[z] (1-9 scale)					
	Quality composite				Field weathered[y]	Artificially weathered[x]			CBWA1[w]	CBWB	CBWC			
Cultivar	2003	2004	2005	Mean	2003	2003	2004	Mean	2001	2002	2003	2004	2005	Mean
Katepwa	425	330	385	380	295	206	324	265	6.4	2.5	6.7	1.9	8.4	5.2
McKenzie	445	375	410	410	306	238	381	310	5.5	2	4.8	1.3	6.3	3.9
CDC Teal	435	355	360	383	285	113	218	166	5.7	4.4	8.9	4.9	8.5	6.4
AC Barrie	460	385	355	400	344	321	352	337	5.6	2.6	3.3	3.8	5.9	4.2
Superb	415	355	375	382	299	224	388	306	2.2	1.1	5.7	2.3	4.7	3.2
KANE	402	370	365	380	315	325	336	331	5.1	1.1	2.9	1.4	1.7	2.4
LSD (P = 0.05)				34				112						1.7
Replicates	1	1	1	3	1	1	1	2	1	1	1	1	1	5

[z]((# spikes with 0 sprouts) × 1 + (# spikes with 1 sprout) × 2 + (# spikes with 2 sprouts) × 3 + (# spikes with 3–5 sprouts) × 5 + (# spikes with >3 sprouts) × 9)/ total number of spikes evaluated. Spikes were collected at maturity and stored at -20°C until they were evaluated. The mean was calculated over the five years of tests using SAS PROC MIXED procedure.
[y]Field weathered samples are harvested when declines in falling number were observed for the sprouting susceptible cultivar Roblin.
[x]Collected at maturity, this material is placed in a rain simulator at 15°C for 48 h, dried and then seed is ground into meal for falling number determination.
[w]CBWA1 and CBWB are preregistration tests.

Table 6. Wheat and flour analytical data for KANE and checks in the Central Bread Wheat Coop, 2003–2005. End-use quality testing was performed using American Association of Cereal Chemists methods and was conducted by the Grain Research Lab of the Canadian Grain Commission on composite samples created from grain harvested from 6, 4, and 5 locations for respective years of the Central Bread Wheat Coop

												Farinograph				Canadian Short Process (150 ppm ascorbic acid)						
Cultivar	Test weight (kg hL^{-1})	Kernel weight (mg $kernel^{-1}$)	Wheat protein (%)	Flour protein (%)	Falling number (s)	Amylo-graph (BU^y)	Flour yield (%)	Flour ash (%)	Agtron Colour (%)	Starch damage (%)	Particle size index	Absorp-tion (%)	Dough develop-ment time (min)	Mixing tolerance index (BU)	Stability Index (min)	Loaf Volume (cm^3)	Loaf appearance (1–10 scale)	Crumb structure (1–10 scale)	Crumb Colour (1–10 scale)	Absorp-tion (%)	Mixing energy (W-h kg^{-1})	Mixing time (min)
Katepwa	79.9	33.3	13.9	13.3	380	473	74.5	0.47	78	7.8	54	66.6	5.3	25.0	8.2	1120	7.6	6.2	7.8	70.0	6.1	3.6
McKenzie	81.0	34.7	14.2	13.5	410	572	75.6	0.45	80	8.2	52	68.2	5.9	35.0	8.2	1093	7.6	6.1	7.7	71.7	6.8	4.0
CDC Teal	80.0	34.9	14.5	14.0	383	488	75.0	0.44	78	7.2	56	66.7	7.3	30.0	16.4	1155	7.7	6.0	7.9	70.0	7.3	4.1
AC Barrie	81.0	35.5	14.1	13.6	400	523	75.6	0.45	79	7.4	55	65.6	6.7	25.0	10.4	1118	7.5	6.1	7.8	69.7	7.9	4.5
Superb	80.6	38.9	13.7	13.0	382	598	75.6	0.44	75	8.0	53	67.5	6.8	32.5	16.2	1095	7.5	6.0	7.7	71.0	7.7	4.7
KANE	82.0	35.5	14.0	13.6	380	522	76.3	0.43	78	7.8	52	67.5	6.8	32.5	8.7	1113	7.5	6.2	7.7	71.0	6.7	4.2
LSD (P = 0.05)[z]	0.8	1.9	0.6	0.4	34	122	0.5	0.02	3	0.5	1.8	1.0	1.2	18.2	11.5	43	0.3	0.3	0.3	1.0	1.2	0.3

[z]LSD of means was based on the checks and KANE and calculated using the SAS proc-mixed procedure. Data consists of single measurements in each of the three years of testing.
[y]Brabender Units

Flag leaf attitude. Horizontal.
Upper culm internode: Slight curvature at maturity, glabrous and slightly waxy. It is hollow stemmed and has a thin wall.
Culm colour. Absent or very weak glaucousity. The straw exhibits medium anthocyanin colouration just prior to maturity but this colouration dissipates leaving typical white to yellow straw when plants are fully mature.
Maturity. Medium, 1.7 d later than McKenzie and 1.4 d earlier than Superb.
Plant height. This line is intermediate in height, about 2 cm taller than Superb.
Lodging resistance. Good; similar to AC Barrie and CDC Teal, slightly weaker than Superb.

SPIKE CHARACTERISTICS
Shape. Oblong (parallel-sided).
Size. Shorter than McKenzie and AC Domain.
Density. Medium dense, similar to McKenzie and AC Domain.
Attitude. Erect.
Rachis. Sparse hairiness of convex surface of apical segment.
Colour. Weak to medium glaucosity; white colour at maturity.
Awns. Awned.

SPIKELET CHARACTERISTICS
Glumes. Medium length; narrow width; lower glume is slightly pubescent; glume shoulders are elevated; narrow shoulder width; glume beak is acuminate and of medium length; sparse to medium internal glume hairs. Glumes are white in colour at maturity.
Lemma. Slightly curved beak shape.

KERNEL CHARACTERISTICS
Shape. CWRS; ovate in shape with rounded to slightly angular cheeks.
Size: Small-sized with short length and medium width.
Brush. Small with short to mid-long brush hairs.
Embryo. Small, oval shape; crease is narrow and mid-deep.

Maintenance and Distribution of Pedigreed Seed Stocks

The Agriculture and Agri-Food Canada Experimental Farm, Indian Head, Saskatchewan, will maintain the Breeder Seed of KANE. Multiplication and distribution of other classes of pedigreed seed will be handled by Secan, 501-300 March Road, Kanata, Ontario, Canada K2K 2E2.

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