

## Sadash soft white spring wheat

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Sadasivaiah, R. S., Graf, R. J., Randhawa, H. S., Beres, B. L., Perkovic, S. and Virginillo, M. 2009. **Sadash soft white spring wheat** Can. J. Plant Sci. **89**: 1099–1106. Sadash is a soft white spring wheat (*Triticum aestivum* L.) that meets the end-use quality specifications of the Canada Western Soft White Spring class. Sadash is well-adapted to the wheat-growing regions of southern Alberta and southern Saskatchewan. Based on data from the Western Soft White Spring Wheat Cooperative Registration Test from 2003 to 2005, Sadash exhibited high grain yield, mid-season maturity, semi-dwarf stature with very strong straw, and good resistance to shattering. Sadash expressed resistance to the prevalent races of stem rust and powdery mildew, intermediate resistance to loose smut, moderate susceptibility to leaf rust and common bunt, and susceptibility to *Fusarium* head blight. Based on end-use quality analysis performed at the Grain Research Laboratory of the Canadian Grain Commission, Sadash had improved test weight over the check cultivars AC Reed and AC Phil and similar milling and baking performance.

**Key words:** *Triticum aestivum* L., cultivar description, wheat (soft white spring), grain yield, quality, disease resistance

Sadasivaiah, R. S., Graf, R. J., Randhawa, H. S., Beres, B. L., Perkovic, S. et Virginillo, M. 2009. **Le blé tendre blanc de printemps Sadash**. Can. J. Plant Sci. **89**: 1099–1106. Sadash est une variété de blé tendre blanc de printemps (*Triticum aestivum* L.) satisfaisant aux critères de qualité pour la destination finale de la classe « blé tendre blanc de printemps de l'Ouest Canadien ». La variété est bien acclimatée aux régions du sud de l'Alberta et de la Saskatchewan où l'on cultive le blé. Selon les données du Western Soft White Spring Wheat Cooperative Registration Test recueillies de 2003 à 2005, Sadash a un rendement grainier élevé, parvient à maturité à mi-saison, se remarque par un port demi-nain avec une paille très robuste et résiste bien à l'égrènement. Sadash résiste aux races courantes de la rouille de la tige et du blanc, résiste modérément au charbon nu, est moyennement sensible à la rouille des feuilles et à la carie, et est sensible à la brûlure de l'épi causée par *Fusarium*. Selon l'analyse de la qualité en fonction de l'usage final réalisée au laboratoire de recherche sur les céréales de la Commission canadiennes des grains, Sadash a un poids spécifique plus élevé que les cultivars témoins AC Reed et AC Phil, et un rendement similaire pour la mouture et la boulangerie.

**Mots clés:** *Triticum aestivum* L., description de cultivar, blé tendre blanc de printemps, rendement grainier, qualité résistance à la maladie

Sadash (SWS 349) is a high-yielding, soft white spring wheat (*Triticum aestivum* L.) cultivar developed by Agriculture and Agri-Food Canada (AAFC), Lethbridge Research Centre (LRC), Lethbridge, Alberta. It was assigned registration number 6316 by the Variety Registration Office, Canadian Food Inspection Agency on 2007 Aug. 13. Sadash is adapted to the wheat-producing regions of the prairies and meets the end-use quality characteristics of the Canada Western Soft White Spring (CWSWS) wheat class. Developed by soft white spring wheat breeder, Dr. R. S. (Sadash) Sadasivaiah, who passed away unexpectedly in 2005, this cultivar is named in tribute to him and is untiring work on behalf of the industry.

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### Pedigree and Breeding Methods

Sadash was developed using traditional plant breeding methodology. It was selected from the cross SWS207/SWS208//SWS214 made at the AAFC Lethbridge Research Centre in Lethbridge, Alberta, in 1997. Pedigrees of the parental lines are as follows: SWS207 is IDO232/Fieldier//AC Reed; SWS208 is SWS18/Fieldier//SWS53; and SWS214 is IDO236/L2631-19//AC Reed. Increase of the F<sub>1</sub> seed occurred in the greenhouse over the winter of 1997/1998. Selection of F<sub>2</sub> heads from a space planted bulk plot grown in Vauxhall AB occurred in 1998, with culling of the selections based on seed colour, kernel visual distinguishability (KVD) characteristics, and

**Abbreviations:** CWSWS, Canada Western Soft White Spring; DON, deoxynivalenol; FHB, *Fusarium* head blight; KVD, kernel visual distinguishability

black point incidence. These selections were bulked and sufficient seed to plant five F<sub>3</sub> rows was sent to an off-season nursery at Lincoln, New Zealand in 1998/1999. Using a similar selection regime as in the F<sub>2</sub> generation, the retained F<sub>3</sub> heads were bulked and grown at Vauxhall in 1999. Selections taken from this F<sub>4</sub> generation bulk were based on plant type, straw strength, height, maturity, shattering resistance, seed colour, KVD, and black point incidence. Sixty F<sub>5</sub> head rows derived from this bulk plot were grown in New Zealand in the fall/winter of 1999/2000, with selected rows harvested individually. Agronomic performance, disease resistance and end-use quality evaluation of these F<sub>4</sub> derived lines took place from 2000 to 2002. In 2001, Sadash was tested in a preliminary agronomic trial under the code 01PR-1417 code. In 2002, Sadash was tested in the soft white spring wheat B test at four locations in southern Alberta under code 02B-040. Based on excellent agronomic performance, disease resistance, and promising end-use quality, evaluation as SWS349 was initiated in the Western Soft White Spring Wheat Co-operative Registration trial in 2003, with continued evaluation in 2004 and 2005.

Suitability for registration was evaluated in the Western Soft White Spring Wheat Co-operative Registration trial, which is a four-replicate test grown annually at six irrigated locations across southern Alberta (Lethbridge, Vauxhall, Bow Island, Iron Springs) and southern Saskatchewan (Outlook, Saskatoon). The locations represent the major irrigated regions of the Canadian prairies. Sadash was compared with two check cultivars: AC Reed (Sadasivaiah et al. 1993) and AC Phil (Sadasivaiah et al. 2000a). Since the widely grown soft white spring wheat cultivar AC Andrew (Sadasivaiah et al. 2004) was not included in all years of the registration trials (2003), additional data from the registration trials have been presented (2006–2008) where AC Reed, AC Andrew and Sadash were present in the trials.

Disease severity in artificially inoculated field nurseries was estimated for leaf rust (*P. triticina* Eriks. = *P. recondita* Roberge ex Desmaz.) and stem rust (*Puccinia graminis* Pers.: Pers. f. sp. *tritici* Eriks. & e. Henn.) at the AAFC Cereal Research Centre (CRC), Winnipeg using the modified Cobb scale (Peterson et al. 1948). Seedling infection type reactions were determined in the greenhouse for leaf rust races MBDS (12-3), MGBJ (74-2), TJJJ (77-2) and MBRJ (128-1) (McCallum and Seto-Goh 2006) and to stem rust races TMRTK (C10), RKQSR (C63), TPMKR (C53) RTHJT (C57), QTHST (C25) and RHTSK (C20) (Fetch 2005; Roelfs and Martens 1988). Fusarium head blight tolerance was evaluated in field nurseries at Carman, MB, that were spray inoculated with a macroconidial suspension and rated using a visual index (% incidence × % severity/100) as described by Gilbert and Woods (2006). Resistance to loose smut [*Ustilago tritici* (Pers.) Rostr.] was estimated as described by Menzies et al. (2003). Evaluation of common bunt

[*Tilletia laevis* Kuhn in Rabenh. and *T. tritici* (Bjerk.) (Bjerk.) R. Wolff] resistance was conducted at the Lethbridge Research Centre using a composite of races L1, L16, T1, T6, T13 and T19, and planting into cold soil (Gaudet and Puchalski 1989; Gaudet et al. 1993). Reaction to powdery mildew was recorded on a scale of 1–6 (1 = resistant; 6 = highly susceptible) from the registration tests with natural infection in the field. For stripe rust reaction, a field rating of 1–6 was used under natural infection.

End-use quality was evaluated by the Grain Research Laboratory, Canadian Grain Commission, Winnipeg, MB, based on composite samples for each test entry that were prepared from test locations selected on the basis of protein content and grade of the check cultivars. Grain from locations where the checks produced poor quality grain was not included in the quality composites. The PROC MIXED procedure of SAS<sup>®</sup> (Littell et al. 2006) was used to perform a multi-year analysis for agronomic data with environments and replications set as random effects and cultivar set as a fixed effect. For end-use quality data, there were no replicated observations within years, hence standard deviation was reported.

### Performance and Adaptation

Sadash is a hollow-stemmed soft white spring wheat with semi-dwarf stature and an awned spike. Based on evaluation in the Western Soft White Spring Wheat Cooperative Registration trials, Sadash grain yield was significantly higher ( $P \leq 0.05$ ) than the check cultivars AC Reed and AC Phil in 2003 and 2005, but was similar to the checks in 2004 (Table 1). Combined over the 3-yr period, grain yield of Sadash was significantly higher ( $P \leq 0.05$ ) than AC Reed and AC Phil. In 2006 to 2008, Sadash produced similar grain yield to AC Andrew; however, Sadash was significantly higher yielding ( $P \leq 0.05$ ) than AC Reed when combined over 3 yr (Table 1). Overall, Sadash had a greater yield advantage in Alberta than Saskatchewan (Table 1). Sadash matured 2.7 d later than AC Reed, which was similar to AC Andrew. Maturity for Sadash ranged from 95.8 d in 2003 to 119 d in 2004. Plant height ranged from 81.5 cm in 2003 to 97.5 cm in 2004; Sadash was 7 cm taller than AC Reed. Sadash displayed significantly ( $P \leq 0.05$ ) better straw strength than both AC Reed and AC Phil. Sadash had good shattering resistance, similar to the check cultivars in 2003 and 2005; however, it shattered significantly more than both checks in 2004 (Table 2).

Sadash showed moderate resistance to stem rust and loose smut, with intermediate resistance to leaf spotting diseases, which was better than the checks (Table 3). Sadash was moderately susceptible to leaf rust, which is a slight improvement over the checks. Like the other cultivars in this wheat class, Sadash was susceptible to common bunt (Table 3). Based on limited registration data in 2005, Sadash expressed moderate resistance to Fusarium head blight and lower DON accumulation

**Table 1. Grain yield of Sadash compared with the check cultivars in the Western Soft White Spring Wheat Co-operative Registration Trials, 2003–2008**

Cultivar	Yield (kg ha <sup>-1</sup> )																							
	2003		2004		2005		AB		SK		2003–2005		2006		2007		2008		AB		SK		2006–2008	
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	% of Reed	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	% of Reed	
AC Reed	5760	8610	7140	7660	5660	7098	100	6790	6274	7995	7561	6251	7060	100										
AC Phil <sup>z</sup>	6040	8410	6890	7541	5706	7031	99	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
AC Andrew <sup>z</sup>	–	–	–	–	–	–	–	7637	6694	8570	8224	6709	7654	108										
Sadash	6806	9254	7750	8456	5706	7857	111	8680	6668	8448	8544	6731	7875	111										
LSD ( <i>P</i> = 0.05) <sup>x</sup>	561	NS	504	469	528	343		749	NS	NS	514	NS	392											
No. of tests	5	5	6	11	5	16	16	4	5	6	10	5	15	15										

<sup>z</sup>AC Phil in years 2006 to 2008 and AC Andrew in years 2004 to 2005 were not tested in the registration trials.

<sup>y</sup>Alberta test locations: Lethbridge, Vauxhall, Bow Island, and Iron Springs/Diamond City; Saskatchewan test locations: Outlook and Saskatoon. No yield data for the following locations: Iron Springs for year 2003, 2006 and 2007; Saskatoon for 2004; and Outlook for 2006. In 2008, the Diamond City site was added and the Iron Springs site was discontinued.

<sup>x</sup>LSD of means calculated using the SAS PROC MIXED procedure (Littell et al. 2006). NS, non-significant differences.

**Table 2. Summary of agronomic characteristics of Sadash compared with the check cultivars in the Western Soft White Spring Wheat Co-operative Registration Trials, 2003–2005**

Cultivar	Maturity (d)				Height (cm)				Lodging (1–9)				Shattering (1–9)			
	2003	2004	2005	Mean	2003	2004	2005	Mean	2003	2004	2005	Mean	2003	2004	2005	Mean
AC Reed	93.5	115.7	113.6	107.6	74.6	89.9	82.1	82.2	3.6	4.2	3.9	3.9	2.3	2.0	2.0	2.1
AC Phil	94.6	116.3	112.3	107.7	75.4	89.1	82.9	82.4	4.2	5.0	4.3	4.5	2.0	2.0	2.1	2.0
AC Andrew	95.4	–	–	–	78.6	–	–	–	3.0	–	–	–	2.1	–	–	–
Sadash	95.8	119.0	116.0	110.3	81.5	97.5	88.7	89.2	2.9	2.8	3.4	3.0	2.3	3.0	2.2	2.5
LSD ( <i>P</i> = 0.05) <sup>z</sup>	1.37	1.5	2.05		3.2	3.23	1.98		0.91	1.27	0.466		NS	0.534	NS	
No. of tests	6	5	5	16	6	5	6	17	6	5	6	17	5	4	4	13

<sup>z</sup>LSD of means was based on the checks and Sadash and calculated using the SAS PROC MIXED procedure (Littell et al. 2006).

**Table 3. Disease severities and ratings<sup>z</sup> of Sadash compared with the check cultivars in the Western Soft White Spring Wheat Co-operative Registration Trials, 2003–2005**

Cultivar	Stem rust <sup>y</sup> (% severity, rating)			Leaf rust <sup>x</sup> (% severity, rating)			Common bunt <sup>w</sup> (% infection, rating)			Leaf spots <sup>v</sup> (% severity, rating)	
	2003	2004	2005	2003	2004	2005	2003	2004	2005	2004	2005
AC Reed	90 S	60 MS	30 MS	50 S	25 MR-MS	77 S	71 VS	69 S	69 S	7.7 I	8.0 MS
AC Phil	90 S	70 S	50 MS-S	50 S	30 MR-MS	77 S	60 VS	68 S	71 S	7.3 I	8.0 MS
Sadash	15 R-MR	5 R	25 MR	45 MR-MS	20 MR-MS	55 MS	58 VS	63 S	47 I-MS	5.7 MR	7.0 I

  

Cultivar	Loose smut <sup>u</sup> (% infection, rating)			<i>Fusarium</i> head blight <sup>t</sup> (FHB Index%, rating, DON)				
	2003	2004	2005	2005	2006	2007	2008	DON, ppm (2005)
AC Reed	12 R	50 I	56 MS	5.9 MR	36.0 MS	43.8 S	15.3 MS	13.5
AC Phil	14 R	32 I	62 MS	9.8 MR	30.6 MS	–	–	12.4
Sadash	49 I	21 MR	27 MR	9.9 MR	51.0 S	80.8 S	33.7 S	10.0

  

Cultivar	Powdery mildew (1–6) <sup>s</sup>			Stripe rust (1–6) <sup>s</sup>			Black point (%) <sup>s</sup>		
	2003	2004	2005	2003	2004	2005	2003	2004	2005
AC Reed	1.9	2.2	2.4	1.1	2.0	1.6	15.9	18.9	9.5
AC Phil	2.1	2.2	2.4	1.3	2.0	1.4	14.4	21.4	6.2
Sadash	1.9	1.8	2.3	1.2	1.6	1.3	14.1	19.2	10.3

<sup>z</sup>Disease rating class: VR = very resistant, R = resistant, RMR = resistant to moderately resistant, MR = moderately resistant; I = intermediate rating; MRMS = moderately resistant to moderately susceptible, MSS = moderately susceptible to susceptible; S = susceptible (% incidence × % severity/100, rating).

<sup>y</sup>Caused by *Puccinia graminis* Pers.:Pers. f. sp. *tritici* Eriks. E. Henn. Races used include TMRTK, RKQSR, TPMKR, QTHST, RHTSK and MCCFR.

<sup>x</sup>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).

<sup>w</sup>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 1:1:1:2:2 ratio (vol/vol).

<sup>v</sup>Caused by main leaf spotting pathogens: *P. tritici-repentis*, *P. nodorum*, *M. graminicola*, and *C. sativus*.

<sup>u</sup>Caused by *Ustilago tritici* (Pers.) Rostr. Races used include T2, T9, T10 and T39.

<sup>t</sup>Caused by *Fusarium graminearum* Schwabe (teleomorph *Gibberella zeae* (Schwein.) Petch).

<sup>s</sup>Powdery mildew caused by *Blumeria graminis*, Stripe rust caused by *Puccinia striiformis*. The primary fungi associated with black point are *Alternaria alternata*, *Cochliobolus sativus* and *Fusarium Proliferatum*. Resistance rated under conditions of natural infection; 1 = resistant, 6 = highly susceptible.

than the checks under inoculated conditions at Carman, MB. Additional post-registration data for the 2006 to 2008 period showed that Sadash was susceptible to *Fusarium* head blight (FHB) (Table 3). Under field conditions, Sadash exhibited resistance to the prevalent races of stripe rust and powdery mildew. Black point incidence was similar to AC Reed (Table 3). Based on the 3 yr of registration test data (2003–2005) for seedling reaction to stripe rust, Sadash exhibited better seedling resistance than both the check cultivars (Table 4).

Based on 3 yr of registration testing, Sadash was considered suitable for the CWSWS class, exhibiting milling and baking performance similar to that of the check cultivars (Table 5). The kernel mass of Sadash was about 1.5 mg higher than both AC Reed and AC Phil. Based on end-use quality analysis at the Grain Research Laboratory of the Canadian Grain Commission, Sadash had improved test weight over AC Reed and AC Phil, with an average of 1.5 kg hL<sup>-1</sup> over AC Reed (Table 5). Sadash has grain and flour protein concentration similar to the mean of the checks. Kernel texture of Sadash is slightly softer than the check cultivars. Sadash had similar rheological properties and slightly higher flour yield and cookie spread than AC Reed and AC Phil (Table 5).

Three years of testing in the Western Soft White Spring Wheat Cooperative Registration trials indicated that Sadash is well-adapted for production in the irrigated areas of southern Alberta and Saskatchewan. Stem rust resistance, determined in inoculated nurseries in the eastern prairies, suggests that this variety may have some adaptation in eastern Saskatchewan and Manitoba (Table 3).

### Other Characteristics

Plant characteristics were recorded from greenhouse increases and experimental field plots grown in 2006 and 2007 at Lethbridge, AB.

### Seedling Characteristics

COLEOPTILE COLOUR: Green. Very weak anthocyanin colouration.

JUVENILE GROWTH HABIT: Intermediate.

SEEDLING LEAVES: Glabrous leaf sheaths and blades of lower leaves.

TILLERING CAPACITY (AT LOW DENSITIES): Medium.

### Adult Plant Characteristics

GROWTH HABIT: Semi-erect to Intermediate.

FLAG LEAF: Dark green with glabrous sheath and blade. Weak auricle colouration, and auricle margins are slightly pubescent. Flag leaf sheath has strong to very strong waxy bloom.

FLAG LEAF ATTITUDE: Drooping (recurved).

UPPER CULM INTERNODE: Straight at maturity and medium waxy. It is hollow stemmed and has a thin wall.

CULM COLOUR: Glabrous.

Table 4. Seedling stripe rust reaction of Sadash compared with the check cultivars inoculated with three races in controlled environment conditions in the Western Soft White Spring Wheat Co-operative Registration Trials, 2003–2005

Cultivar	SRBI-84			SCR-89-O			SLR-Y2K		
	2003	2004	2005	2003	2004	2005	2003	2004	2005
AC Reed	10/10 (0) <sup>z</sup>	12/12 (0)	10/10 (0)	6/10 (0), 4/10 (4)	9/10 (0), 1/10 (2)	8/10(0), 2/10 (2)	10/10 (4)	12/12 (4)	10/10 (4)
AC Phil	8/10 (0), 2/10 (4)	10/12 (0), 2/12 (2)	9/10 (0), 1/10 (2)	10/10 (0)	10/12 (0), 2/12 (2)	8/10 (0), 2/10 (2)	10/10 (4)	12/12 (4)	10/10 (4)
Sadash	9/9 (0)	11/11 (0)	10/10 (0)	7/9 (0), 2/9 (4)	10/10 (0)	10/10 (0)	9/9 (4)	8/12 (0), 4/12 (2)	9/10 (0), 1/10 (2)

<sup>z</sup>Number of plants/total inoculated, infection type in parentheses, 0 = no symptoms or flecking, 4 = highly susceptible.

**Table 5. Mean wheat and flour analytical data<sup>2</sup> for Sadash and checks cultivars in the Western Soft White Spring Wheat Co-operative Registration Trials for 2003–2005**

Cultivar	Test weight (kg hL <sup>-1</sup> )	Kernel weight (mg kernel <sup>-1</sup> )	Wheat protein (%)	Flour protein (%)	Protein loss	Hagberg falling number (s)	Amylograph viscosity (BU)	Flour yield (%)	Flour ash (%)	Flour Agtron colour (%)	Starch Damage (%)	Particle size index
AC Reed	79.6	35.7	10.7	9.8	0.9	332	342	75.0	0.5	75.3	3.2	70.3
AC Phil	79.1	34.9	10.8	9.8	1.0	315	278	75.0	0.5	75.3	3.2	69.3
Mean of Checks	79.3	35.3	10.8	9.8	1.0	323	310	75.0	0.5	75.3	3.2	69.8
Sadash	81.1	36.8	10.8	9.8	1.1	333	300	75.6	0.5	74.7	3.1	70.7
SD	1.07	0.95	0.05	0.02	0.07	10.14	32.19	0.35	0.01	0.38	0.09	0.69

Cultivar	Alkaline water retention capacity	Farinograph 54–21 <sup>3</sup>					Alveograph			Cookie	
		Pelshenke	Absorption (%)	Dough develop- ment time (min)	Mixing tolerance index (BU)	Stability index (min)	Length	P	W	Spread (mm)	Ratio
AC Reed	62.3	22.7	53.8	1.8	151.7	1.3	157.0	21.7	62.7	82.4	8.8
AC Phil	61.5	24.0	53.4	1.8	155.0	1.5	156.7	21.7	66.3	82.4	8.6
Mean of Checks	61.9	23.3	53.6	1.8	153.3	1.4	156.8	21.7	64.5	82.4	8.7
Sadash	62.3	29.0	53.8	1.8	146.7	1.4	140.3	23.7	68.3	82.9	8.5
SD	0.49	3.34	0.22	0.05	4.19	0.13	9.53	1.15	2.87	0.27	0.16

<sup>2</sup>End-use quality testing was conducted by the Grain Research Lab of the Canadian Grain Commission on composite samples from various locations.

<sup>3</sup>American Association of Cereal Chemists (2002).

**MATURITY:** Medium, 3 d later than AC Read and similar to AC Andrew (Table 2). The straw exhibits no anthocyanin colouration just prior to maturity and has white straw when plants are fully mature.

**PLANT HEIGHT:** This line is intermediate in height, about 7 cm taller than AC Reed and 3 cm taller than AC Andrew (Table 2).

**LODGING RESISTANCE:** Intermediate; better than AC Reed and AC Phil and similar to AC Andrew (Table 2).

#### *Spike Characteristics*

**SHAPE:** Tapering.

**LENGTH:** Medium, similar to AC Andrew, slightly longer than AC Reed.

**DENSITY:** Medium.

**ATTITUDE:** Erect.

**RACHIS:** Absent hairiness of convex surface of apical segment and slightly pubescence of margins.

**COLOUR:** White colour at maturity.

**AWNS:** Awned.

#### *Spikelet Characteristics*

**GLUMES:** Medium length and width; lower glume is glabrous; glume shoulders are straight and medium wide; glume beak is straight and of medium length; sparse internal glume hairs. Glumes are white in colour at maturity.

**LEMMA:** Straight.

#### *Kernel Characteristics*

**TYPE:** Soft, white in colour.

**SHAPE:** Oval in shape with rounded to slightly angular cheeks.

**SIZE:** Medium sized with medium length and medium to wide width.

**BRUSH:** Medium-sized with short to mid-long brush hairs.

**EMBRYO:** Med-sized round shape; crease is mid-wide and mid-deep.

**PHENOL REACTION:** Fawn to light brown.

#### **Maintenance and Distribution of Pedigreed Seed**

Breeder Seed of Sadash was produced by selecting and bulk-threshing several hundred heads from an  $F_{10}$  increase plot grown in New Zealand. This seed was divided into 120 portions and grown under irrigation at Lethbridge, as rows in 2005 and as plots in a two replicate randomized complete block in 2006. Culling of the plots was based on the presence of residual segregation and off-type plants. In 2006, two replicates of 58 small plots (total of 116 small plots) were inspected by the Canadian Food Inspection Agency and bulk harvested to produce approximately 300 kg of

initial Breeder Seed. Breeder Seed will be maintained by the Seed Increase Unit of the Research Farm, P.O. Box 760, Indian Head, Saskatchewan, Canada S0G 2K0. Application for Plant Breeders = Rights has been filed. The variety will be added to the Organisation for Economic Co-operation and Development list of cultivars. Sadash has been released for distribution to SeCan Association, 501-300 March Rd., Kanata, Ontario, Canada K2K 2E2 ([www.secan.com](http://www.secan.com)).

This paper is dedicated to the memory of soft white spring wheat breeder Dr. R. S. Sadasivaiah, a dear friend, colleague and mentor. Financial support from the producer supported Western Grains Research Foundation Check-off on wheat is gratefully acknowledged. Appreciation is expressed to the following: N. Edwards and E. Lysenko (Grain Research Laboratory, Canadian Grain Commission, Winnipeg, MB) and D. Niziol (CRC, AAFC, Winnipeg) for end-use suitability analysis; J. Gilbert (CRC, AAFC, Winnipeg) for assessing reaction to Fusarium head blight and leaf spots; J. G. Menzies (CRC, AAFC, Winnipeg) for determining reaction to loose smut; T. Fetch and B. McCallum (CRC, AAFC, Winnipeg) for assessing reaction to stem and leaf rust; D. A. Gaudet and T. Despins (Lethbridge Research Centre, AAFC, Lethbridge, AB) for assessing reaction to common bunt; D. T. Gehl, Research Farm (AAFC, Indian Head, SK) for production of Breeder Seed.

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