

REQUEST FOR SUPPORT OF REGISTRATION OF 11SPELT11

CROP KIND: Wheat

TYPE: Spring Spelt wheat

PROPOSERS: P. Hucl and C. Briggs
CDC, Univ. of Saskatchewan, Saskatoon, SK, S7N 5A8

TEST NUMBERS: 11SPELT11

PEDIGREE: CDC Zorba/CDC Origin

11SPELT11 was selected from the cross CDC Zorba/CDC Origin.

The cross between CDC Zorba and CDC Origin was made during the winter of 2004. The F₁ generation was grown in the field in 2004. The F₂, F₃ and F₄ generations were grown in bulk plots at Saskatoon during the 2005, 2006 and 2007 crop seasons, respectively. F₄-derived F₅ head rows ("hills") were grown in a dryland nursery in 2008. The F₅ hills were selected on the basis of earlier heading relative to CDC Zorba, lack of awns, reduced height and lodging. Individual F₅ spikes were selected and sown in F₆ hills in 2009 in a dryland nursery at Saskatoon and the same selection criteria applied as in 2008. Subsequently, selected lines were evaluated in an unreplicated yield plot nursery in 2010 and selected using the same criteria as in 2009, with the addition of yield, grain protein concentration, Falling Number and SDS sedimentation volume. A line identified as 11SPELT11 was subsequently evaluated in local yield tests in 2011 at four sites and in the Private Spring Spelt Wheat Test from 2012 to 2016, under the same identity. 11SPELT11 is F₅-derived and breeder seed was developed from spikes harvested in the F₁₀ generation

AREA OF ADAPTATION: Longer crop season wheat growing areas of Saskatchewan and Alberta.

STRENGTHS: High yield coupled with earlier maturity, shorter straw and less lodging.

WEAKNESSES: Those inherent to spelt wheat.

DESCRIPTION: 11SPELT11 spring spelt is awnless with reddish-brown glumes and hollow stems. Based on 30 site-years of data from the Private Spring Spelt Wheat Test, 11SPELT11 was 23%, 9%, 6% and 10% higher yielding (hull on basis) than CDC Nexon, CDC Zorba, CDC Origin and CDC Silex, respectively. 11SPELT11 was shorter-strawed than the spelt checks with a lower lodging score (Table 1). 11SPELT11 was earlier heading and maturing than all the spelt checks. 11SPELT11 had an intermediate test weight relative to the spelt checks but a lower kernel weight. The threshability of 11SPELT11 was similar to CDC Nexon and CDC Zorba, the two spelt check cultivars with higher threshability (Table 1). 11SPELT11 had an intermediate grain protein relative to the spelt check cultivars.

11SPELT11 was rated M/MS/S in reactions to prevalent races of leaf rust but was susceptible to stem rust (Table 2). The reaction of 11SPELT11 to stripe rust was in the range of the spelt check cultivars (Table 2). 11SPELT11 was resistant to loose smut and bunt. The average (n=11 trials) FHB index for 11SPELT11 was 39% while the spelt checks ranged from 12 to 32%. The average DON value (n=4) was in the range of the checks.

11SPELT11 has a soft red kernel and weak gluten characteristics desired for spelt wheat marketing (Table 3). Averaged over four years of testing 11SPELT11 had Falling Number, RVA peak values and alpha-amylase activity in the range of the spelt checks.

Acknowledgement of Independent Test Cooperators:

Dr. A. Brule-Babel (University of Manitoba), Drs. R.M. DePauw and R. Cuthbert (AAFC-SPARC), Messrs. E. Johnson and L. Nielsen (AAFC-Scott), and Dr. Dean Spaner (University of Alberta).

Table 1. Summary of agronomic data, Spring Spelt Registration Test (2012-2016)

		Grain						Test	Kernel	Thresh-	Grain
		Yield	%	Heading	Maturity	Height	Lodging	weight	weight	ability	Protein
Entry	NAME	kg/ha	CDC Nx	days	days	cm	1 to 9	kg/hL	mg	%	%
1	AC Barrie	3606	96.9	57.4	95.0	96.5	2.2	78.8	34.1	97	15.5
2	CDC Nexon	3720	100.0	65.5	100.7	123.8	6.4	75.8	39.6	40	14.9
3	CDC Zorba	4185	112.5	63.9	98.4	122.7	4.0	74.1	37.9	38	15.7
4	CDC Origin	4316	116.0	63.6	100.1	117.9	2.8	75.1	38.2	18	16.5
5	CDC Silex	4177	112.3	61.0	98.1	112.5	4.4	76.4	37.6	26	16.0
6	11SPELT11	4575	123.0	60.2	95.7	111.2	2.5	74.9	37.2	37	15.9
	# of sites	30		21	24	28	24	29	29	29	29

Table 2. Disease reaction data, Spring Spelt Registration Test (2012-2016)

Entry	NAME	LRC					CRC	CRC	AAFC	AAFC	CDC	CRC	CDC	
		Bunt					Loose smut				Leaf spots			
		%					%				%			
1	AC Barrie	8 R	14 MR	17 I	18 I	14 I	40	41	0	1.4	41	37 S	60	55
2	CDC Nexon	1 R	2 R	1 R	0 R	0 R	0	0	0	no data	8	26 MS	10	18
3	CDC Zorba	1 R	2 R	1 R	0 R	1 R	2	0	0	0.0	14	22 MS	9	27
4	CDC Origin	1 R	2 R	2 R	0 R	3 R	3	7	0	no data	18	26 MS	26	37
5	CDC Sillex	6 R	2 R	1 R	0 R	0.5 R	0	8	12	0.0	27	14 I	16	47
6	11SPELT11	20 I	1 R	5 MR	11 MR	11 MR	24	0	0	0.0	31	17 I	25	25
		2012	2013	2014	2015	2016	2012	2013	2015	2016	2012	2012	2013	2014

Entry	NAME	CDC	CRC1	CRC2	CDC	CRC	CDC		AAFC Morden	AAFC Brandon	CDC		AAFC Brandon	CDC	AAFC Brandon						
		stem rust																			
		Sev IT					Sev	IT	Sev	IT	Sev	IT	Sev	IT	Sev	IT					
1	AC Barrie	35 mr	10i	50i	50S	40i	20	Ms	3	mmr	20	i	0	10	mr	30	ms	15	i		
2	CDC Nexon	25 ms	50s	80s	15S	30s	10	Mr	20	s	70	s	1	mr	30	ms	60	s	10	ms	
3	CDC Zorba	40 s	40s	90s	25S	90s	20	S	80	s	90	s	10	s	80	s	60	s	99	s	
4	CDC Origin	35 s	40s	90s	25S	90s	15	S	80	s	90	s	15	s	70	s	50	s	90	s	
5	CDC Sillex	50 s	40s	99s	30S	99s	20	S	90	s	90	s	5	ms	99	s	90	s	90	s	
6	11SPELT11	35 s	50s	90s	60S	90s	15	S	60	s	90	s	10	ms	99	s	80	s	90	s	
		2012	2012	2012	2013	2013	2014	2014	2014	2014	2014	2014	2014	2015	2015	2015	2015	2016	2016	2016	2016

Entry	NAME	CDC	CRC	CDC	CRC	CDC		Morden	CDC	Morden	CDC	Morden					
		Leaf rust															
		Sev IT				Sev	IT	Sev	IT	Sev	IT	Sev	IT				
1	AC Barrie	55 s	72 S	80S	68MMS	60	S	70	MSS	50	s	70	MSS	90	s	70	MSS/S
2	CDC Nexon	10 mrms	28 MR	20S	10RMR	45	S	3	M	1	mr	13	M	0		18	M
3	CDC Zorba	15 ms	17 MR	15Mrms	33M	50	S	10	M	5	mr	35	M	10	mss	13	M
4	CDC Origin	20 ms	55 MS	30Ms	33M	85	S	23	M	1	mr	40	M	15	mss	38	M
5	CDC Sillex	75 s	72 S	50S	20M	50	S	38	M	5	mrms	47	M	60	s	33	M
6	11SPELT11	75 s	55 MS	70S	30M	70	S	42	M	1	mr	47	M	75	s	42	MS/M
		2012	2012	2013	2013	2014	2014	2014	2014	2015	2015	2015	2015	2016	2016	2016	2016

Table 2. Disease reaction data continued, Spring Spelt Registration Test (2012-2016)															
		LRC			Creston	LRC		CDC	LRC	LRC		Creston			
Stripe rust															
Entry	NAME	%	LRC	Creston	Sev	Sev	IT	inc (%)	Sev	IT	Sev	Sev	IT	Sev	IT
1	AC Barrie	53 S	75S	45MS	45	65	S	100	60	S	50	80	S	95	S
2	CDC Nexon	18 MR	5R	5R	5	15	MR	100	5	Mr	10	10	MR	15	MR
3	CDC Zorba	20 MR	15R	45MS	15	5	R	100	5	Mr	15	50	MS	45	I
4	CDC Origin	10 MR	25MR	75S	15	10	R	100	25	Ms	20	50	MS	95	S
5	CDC Silex	5 VR	10R	5R	15	2	R	0	0	0	7	5	R	5	R
6	11SPELT11	6 R	10R	5R	5	5	R	100	15	Mr	5	40	MS	75	S
		2012	2013	2013	2014	2014	2014	2014	2014	2014	2015	2016	2016	2016	2016
		Carman		CRC		Carman	Portage	Glenlea		Carman		Morden			
FHB															
Entry	NAME	VRI	VRI	DON	FHB	VRI	VRI	VRI	VRI		VRI	Rating	DON		Rating
		%	%	ppm	ISD	%	%	%	%	rxn	%	Index	ppm	ISD	ISD
1	AC Barrie	37 I	16 MS	2.9	17 I	32	21	9	22	I	46	I	44	29	MR
2	CDC Nexon	31 I	5 R	2.4	12 MR	6	3	11	19	I	3	R	38	23	R
3	CDC Zorba	46 MS	15 MS	4.1	20 I	33	9	1	30	I	30	MR	23	16	R
4	CDC Origin	33 I	18 MS	4.3	21I	49	8	9	38	MS	32	MR	27	19	R
5	CDC Silex	50 MS	5 R	1.7	8 R	45	15	11	35	MS	28	MR	48	31	MR
6	11SPELT11	53 MS	3 R	8.8	12 MR	55	16	21	31	MS	57	MS	33	23	R
		2012	2012	2012	2012	2013	2013	2013	2014	2014	2014	2014	2014	2014	2014
		Carman		Morden		Carman		Morden		Carman		Morden			
FHB															
Entry	NAME	VRI		VRI	Rating	DON		Rating	VRI		VRI	Rating	DON		Rating
		%	rxn	%	Index	ppm	ISD	ISD	%	rxn	%	Index	ppm	ISD	ISD
1	AC Barrie	29	I	61	MS	24	17.5	I	23	I	50	I	15.9	12.4	R
2	CDC Nexon	29	I	21	R	3	3.3	R	18	I	0	R	8.6	5.3	R
3	CDC Zorba	42	MS	54	MS	6	6.7	R	33	I	8	R	5.3	4.3	R
4	CDC Origin	26	I	22	R	10	8.1	R	25	I	36	MR	9.7	8.2	R
5	CDC Silex	24	I	43	I	9	8.3	R	36	MS	50	I	19.1	14.3	R
6	11SPELT11	37	MS	61	MS	12	10.2	R	33	I	39	MR	16.6	12.6	R
		2015	2015	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2016	2016

Table 2. Disease reaction data continued, Spring Spelt Registration Test (2012-2016)

Entry	NAME	Seedling leaf rust ratings																
		12-3 MBDS	28-1 MBR	74-2 MGBJ	06-1-1 TDBG	77-2 TBJJ	11-180-TDBG	2-3 MBDS	28-1 MBR	74-2 MGBJ	06-1-1 TDBG	77-2 TBJJ	TPM	RHT	TMR	RKQ	QTH	RTH
1	AC Barrie	1+	;1=	4	1-	1+3-	3-	1	1-	1+	1+	1+	1-	0	1	1-	1-	0;
2	CDC Nexon	3+	3+	4	3+	3+	3+	3	4	3	3+	3	4	2-	4	12-	3-3	2-
3	CDC Zorba	;1=	3+	4	3+	3+	4	3	4	3+	3	3	4	2-	4	12-	3-3	11-
4	CDC Origin	3+	3+	4	X/3+	4	4	-	4	3+	3+	3	4	22-	4	11+	3	23-
5	CDC Silex	3+	3+	4	4	3+	4	3	4	3+	3	3+	4	33+	34	34	34	33+
6	11SPELT11	3+	3+	4	3+	3+	3+	3	4	3	3+	3+	4	1-1	4	;1-	22+	12-
		2012	2012	2012	2012	2012	2012	2013	2013	2013	2013	2013	2014	2014	2014	2014	2014	2014

Entry	NAME	Seedling leaf rust ratings												
		12-3 MBDS	128-1 MBRJ	74-2 MGBJ	06-1-1 TDBG	77-2 TBJJ	11-180-1 TDBG	12-3 MBDS	128-1 MBRJ	74-2 MGBJ	06-1-1 TDBG	77-2 TBJJ	11-180-1 TDBG	
1	AC Barrie	2	2	3= (2 1P)	1+	3-	2	3	3	4	4	4	;23	
2	CDC Nexon	3+	4	3-	4	3+	3+	4	4	4	4	4	3+4	
3	CDC Zorba	x	4	3	4	3=	4	3	4	4	4	4	4	
4	CDC Origin	3=	4	3-	4	3=	4	3+	4	4	4/X	4	4 (;1+1P)	
5	CDC Silex	3=	4	3-	4	3=	4	4	4	4	4	4	4	
6	11SPELT11	3	4	3-	4	3=	4	4	4	4	4	4	4	
		2015	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2016	

Entry	NAME	Seedling stem rust ratings													
		TPM	TMR	QTH	RKQ	RHT	RTH	MCC	TPM	RHT	TMR	RKQ	QTH	RTH	MCC
1	AC Barrie	;1-	;1-	1-	;1-	0;	0;	0;	1-	0	1	1-	1-	0;	1
2	CDC Nexon	34	4	1-	1-	;1-	1-	1-1	4	2-	4	12-	3-3	2-	22+
3	CDC Zorba	34	34	;1-	1-	11-	1-	1-1	4	2-	4	12-	3-3	11-	12-
4	CDC Origin	34	33+	1	1-	11-	1-	1-	4	22-	4	11+	3	23-	2-
5	CDC Silex	34	34	33+	33+	23	34	33+	4	33+	34	34	34	33+	34
6	11SPELT11	34	34	1-	1-	1-	1-	;1-	4	1-1	4	;1-	22+	12-	12-
		2013	2013	2013	2013	2013	2013	2013	2014	2014	2014	2014	2014	2014	2014

Entry	NAME	Seedling stem rust ratings													
		TPM	RHT	TMR	RKQ	QTH	RTH	MCC	TPM	RHT	TMR	RKQ	QTH	RTH	MCC
1	AC Barrie	0;	0;	;1-	1	2-	12-	0;	;1-	0;	11+	1-	1	1-	0
2	CDC Nexon	4	1-	4	2-	2-	11-	1+	4	1	4	3-	33+	1-1	22+
3	CDC Zorba	4	11+	34	2-	1+	11-	1	4	1-	4	22+	3-3	1-	11+
4	CDC Origin	4	1	4	1	1+	2-2	1	34	1-	34	2-2	3-	22+	12-
5	CDC Silex	4	33+	34	4	4	4	4	33+	33+	34	34	4	34	33+
6	11SPELT11	4	;1-	4	1	11+	12-	11-	3	;1-	4	;1-	11+	1-1	11+
		2015	2015	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2016	2016

Table 3. Quality analyses, average of four years (2012-2015)

Entry		Flour			Flour				Farinograph				CSP Bake Test			Mixing		Mixing		RVA Pk (RVU)	a-amylase (c.u.)
		Protein 14%amb	yield 14%amb	FI Ash (%)	protein 14%amb	SKCS H.I.	Agtron	FABS (%)	DDT (min)	MTI (BU)	STA (min)	LV (cc)	App	Struct	CrColor	Energy Whr/Kg	Time (min)	FN (sec)			
1	AC Barrie	14.4	75.2	0.45	13.2	70	58.4	60.1	6.1	29.3	9.5	1088	3.5	3.2	3.5	6.6	4.6	422	164.1	0.061	
2	CDC Nexon	14.0	73.8	0.47	12.7	23	47.2	54.8	3.2	52.5	4.1	991	3.0	3.1	3.1	4.9	3.3	349	135.6	0.091	
3	CDC Zorba	14.7	72.2	0.46	13.3	25	51.4	57.2	2.9	55.5	3.8	1008	3.1	2.9	2.8	4.1	2.7	288	93.0	0.140	
4	CDC Origin	15.5	73.6	0.49	14.1	28	47.3	57.0	3.0	57.3	3.4	998	2.9	2.6	2.8	3.6	2.6	298	94.4	0.120	
5	CDC Silex	15.1	72.3	0.51	13.3	32	43.3	57.8	2.7	59.3	3.4	981	2.9	2.8	3.0	4.4	3.1	385	153.1	0.052	
6	11SPELT11	14.9	72.4	0.44	13.4	25	56.9	56.6	3.3	46.3	4.9	994	3.1	3.2	3.2	4.3	2.9	327	104.5	0.108	