REQUEST FOR SUPPORT TO REGISTER PT769

CROP KIND: Wheat **TYPE:** Canada Western Red Spring

PROPOSER: D. Spaner

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TEST NUMBERS: PT769, Entry 11 Parkland B 2010, 0423*F6MBK20

PEDIGREE: Intrepid/CDC Go

PT769 was developed using a modified bulk breeding method. The F_1 generation (10 seeds) generated from crossing during the winter of 2003-2004 was planted in the field at the University of Alberta, Edmonton Research Station (ERS), Edmonton AB in the summer of 2004. The F_2 was grown in 10 m^2 plots at the ERS during the summer of 2005. Two hundred randomly chosen heads were harvested, bulked and advanced to the F_4 in long space planted rows in a winter nursery near Lincoln, New Zealand in the winter of 2006-2007. Approximately 150 randomly chosen heads were bulked and space planted in Edmonton in the summer of 2006, with ≈ 60 heads, selected on the basis of plant type, maturity, lodging and disease resistance. These heads were again bulked and space planted in Edmonton in the summer of 2007, with ≈ 60 heads, selected on the basis of plant type, maturity, lodging and disease resistance and grown as F^7 head rows in New Zealand in the winter of 2007-2008. There, PT769 was selected on the basis of plant type, early maturity and straw strength. Seed from this bulked F_7 head-row was grown as a single entry in an unreplicated yield trial in Edmonton in 2008, and leaf and stem rust, bunt and leaf spot nurseries in Edmonton, and a stripe rust nursery near Creston, BC. Based on cumulative agronomic, disease resistance and quality data, one of the lines was evaluated as 0423*F6MBK20 in replicated yield trials at one Saskatchewan and five Alberta environments in 2009. 0423*F6MBK20 was evaluated in the Parkland B test in 2010 as entry number 11 and subsequently evaluated as PT769 in the Parkland Wheat Cooperative Test from 2011 to 2013.

AREA OF ADAPTATION: Wheat growing regions of Western Canada; predominantly the Parkland eco-region.

STRENGTHS: PT769 is an early maturing, high yielding line of medium height and good lodging resistance. It has very good bunt resistance.

NEUTRAL TRAITS: Stripe rust resistance intermediate to the checks, albeit at the low end of the range. Resistant to Intermediate ratings for stem and leaf rust.

WEAKNESSES: Slightly lower test weight than CDC Teal and AC Splendor. FHB reaction in the range of the checks.

DESCRIPTION: BW769 is an awned, hollow-stemmed line with a useful combination of high yield potential and early maturity, with resistance to common bunt. In three years of testing in the Parkland Cooperative Test, PT769 was higher yielding ($P<0.05$) than Katepwa (11.1%) and AC Splendor (7.3%), and higher yielding than CDC Teal (4.5%) and CDC Osler (0.5%) (Table 1). PT769 matured 1.6 days earlier than CDC Teal, 1.0 days earlier than CDC Osler, 0.3 days earlier than Katepwa and 0.9 days later

than AC Splendor. PT769 exhibited plant height and lodging resistance similar to, or in the range of the checks. Seed mass of PT769 was greater than, while test weight was less than, all check cultivars.

PT769 was rated intermediate to resistant to the prevalent races of stem and leaf rust in three years of testing (Table 2). It was rated in the range of the check cultivars for stripe rust and was rated resistant to common bunt over the three years of testing (Table 2 and Table 6). The FHB disease indices for PT769 were lower than all checks in 4 of 8 station years of testing. Ratings ranged from S to MR over the eight station years (Table 3 and Table 6). DON levels from Ottawa 2013 were 2.6, as compared to 3.2, 1.3, 7.4, and 2.4 for Katepwa, CDC Teal, AC Splendor and CDC Osler, respectively. Two years of end-use quality evaluation (Table 4) has indicated that PT769 is acceptable for the CWRS class (Tables 4 and 5).

SEED AVAILABILITY

Over 300 kg of breeder seed is available from the harvest of one hundred and eleven 15 m rows in the fall of 2013.

Table 1. Agronomic data for PT769 and check cultivars in the Parkland Bread Wheat Cooperative Test, 2011 to 2013

Entry	Yield (kg/ha)	Yield (% checks)	Maturity (days)	Height (cm)	Lodging (1-9)	Test Wt (kg/hl)	Seed Mass (g/1000k)
Katepwa	4443	95	99.8	100.9	2.1	78.6	33.5
CDC Teal	4725	101	101.1	95.9	1.6	78.3	34.7
AC Splendor	4604	99	98.6	99.4	2.2	78.3	36.6
CDC Osler	4914	105	100.5	95.9	2.0	79.2	34.4
Check Mean	4672		100.0	98.0	2.0	78.6	34.8
PT769	**4938**	106	**99.5**	**100.1**	**1.9**	**78.0**	**38.4**
LSD	241		1.7	2.0	0.46	1.0	1.3
Station years	35		28	34	30	35	35

Table 2. Rust, smut, bunt and FHB reactions for PT769 and check cultivars in the Parkland Bread Wheat Cooperative Test, 2011 to 2013

2011									Fusarium Head Blight			
	Stem Rust		Leaf Rust		Loose Smut		Common Bunt		Glenlea		Carman	
	Severity	Response	Severity	Response	%Infection	Rating	%Infection	Rating	Mean VRI	Class	Mean VRI	Class
Katepwa	20.0	MR	33.3	I	0.0	R	15.0	I	11.0	I	30.0	MS
CDC Teal	30.0	I	0.3	R	47.0	I	19.0	I	18.0	MS	51.0	S
AC Splendor	10.0	R	15.3	MR	13.0	R	22.0	I	22.5	S	37.5	MS
CDC Osler	30.0	I	0.0	R	15.0	R	31.0	MS	11.0	I	15.0	I
PT769	**10.0**	**I**	**3.7**	**R**	**20.0**	**MR**	**2.0**	**MR**	**6.7**	**MR**	**24.0**	**MS**
2012									Fusarium Head Blight			
	Stem Rust		Leaf Rust		Loose Smut		Common Bunt		Glenlea		Carman	
	Severity	Response	Severity	Response	%Infection	Rating	%Infection	Rating	Mean VRI	Class	Mean VRI	Class
Katepwa	2.0	R	58.3	MS	8.0	R	20.0	I	8.0	MR	42.5	MS
CDC Teal	2.0	R	20.0	MR	49.0	I	23.5	I	19.0	MS	71.3	S
AC Splendor	2.0	R	38.3	I	36.0	I	16.5	MR	24.0	S	54.0	MS
CDC Osler	2.0	R	2.0	R	23.0	MR	16.8	MR	12.0	I	40.0	I
PT769	**2.0**	**R**	**31.7**	**I**	**37.0**	**I**	**3.3**	**R**	**18.0**	**MS**	**37.5**	**I**
2013									Fusarium Head Blight				
	Stem Rust		Leaf Rust		Loose Smut		Common Bunt		Glenlea	Portage		Carman	
	Severity	Response	Severity	Response	%Infection	Rating	%Infection	Rating	Mean VRI	Mean VRI	Class	Mean VRI	Class
Katepwa	10	I	63.3	S	0	R	20	I	27.0	21.7	MS	27.4	I
CDC Teal	30	I	7.0	R	6	R	18.25	MR	7.0	33.0	S	82.5	S
AC Splendor	7	R	16.7	MR	22	MR	17.5	MR	27.0	33.3	S	58.1	S
CDC Osler	5	R	2.0	R	47	I	17	MR	18.0	24.0	MS	49.3	MS
PT769	**15**	**I**	**0.0**	**R**	**9**	**R**	**4.5**	**R**	**14.0**	**35.3**	**S**	**28.2**	**I**

	Stripe rust reaction							
	Lethbridge 2011		Lethbridge 2012		Lethbridge 2013		Creston 2013	
Identity	Severity	Response	Severity	Response	Sev.	Rate	Sev.	Rate
Katepwa	38	I	33	I	45	MS	65	S
CDC Teal	25	I	10	VR	20	MR	15	R
AC Splendor	50	MS	28	MR	20	MR	25	MR
CDC Osler	37	I	30	MR	15	R	65	S
PT769	**38**	**I**	**33**	**I**	**15**	**R**	**15**	**R**

Table 3: Quality data for PT769 and checks from the Parkland Cooperative test, 2011 - 2013.

2013 Quality data of four check cultivars and PT769

Variety	Wheat and Flour Characteristics						Milling Performance			
	Test Wt	Wheat Pro	Flour Pro	Pro Loss	FN	Amyl Peak	Clean Wht Flr Yld	Flr Yld PB 0.50 Ash	Flour Ash	Starch Dmg
Katepwa	80.1	13.2	12.4	0.8	475	620	75.8	77.0	0.44	8.6
CDC Teal	80.2	13.5	13.1	0.4	470	680	76.2	77.0	0.44	8.2
AC Splendo	79.6	14.1	13.3	0.8	465	650	75.9	76.0	0.46	7.9
CDC Osler	81.0	13.6	12.9	0.7	540	785	75.6	75.5	0.47	8.4
PT769	80.0	13.9	13.3	0.5	470	630	75.2	76.0	0.46	8.7

Variety	Dough Properties							Baking Quality			
	Farino Abs	Farino DDT	Farino MTI	Farino Stab	EXT Area	EXT Rmax	EXT Length	CSP Abs	CSP Pk Tme	CSP WHR /KG	CSP LV
Katepwa	68.1	4.25	20	11.0	69	325	16.3	72	3.5	6.4	1075
CDC Teal	68.3	7.75	30	11.0	99	353	21.3	72	3.6	8.3	1130
AC Splendo	68.8	8.25	15	22.5	106	420	19.8	73	4.2	8.8	1115
CDC Osler	68.6	6.00	5	13.0	74	300	18.5	72	3.2	6.2	1090
PT769	72.7	6.75	15	13.5	103	430	18.7	76	4.8	9.5	1145

2012 Quality data of four check cultivars and PT769

Variety	Test Wt	Ker Wt	Wheat Pro	Flour Pro	Pro Loss	FN	Amyl Peak	Clean Wht Flr Yld	Flr Yld PB 0.50 Ash	Flour Ash	Flour Color L*	Flour Color a*	Flour Color b*	Starch Dmg	PSI
Katepwa	80.6	32.8	14.6	13.9	0.7	410	695	75.0	79.0	0.42	94.2	0.55	10.1	8.0	55
CDC Teal	79.9	32.4	14.9	14.3	0.6	410	730	75.0	79.5	0.41	94.3	0.48	10.2	7.4	58
AC Splendo	79.3	34.9	15.4	14.7	0.7	435	770	75.1	78.5	0.43	94.5	0.48	9.5	7.1	57
CDC Osler	80.5	32.7	15.0	14.4	0.6	495	860	74.8	78.0	0.44	94.3	0.50	11.0	7.4	55
PT 769	79.8	37.1	15.0	14.4	0.6	405	665	74.6	78.0	0.44	94.4	0.53	9.6	8.0	55

	Farino Abs	Farino DDT	Farino MTI	Farino Stab	CSP Abs	CSP Pk Tme	CSP WHR /KG	CSP LV	CSP App	CSP Crumb Struct	CSP Crumb Modifiers[1]	CSP Color
Katepwa	66.6	8.00	25	11.0	67	3.5	8.9	1165	7.4	5.6	o+	7.8
CDC Teal	67.3	9.00	5	24.5	68	4.3	10.9	1195	7.5	6.2	o	7.9
AC Splendo	68.3	10.25	5	29.0	68	4.1	9.8	1130	7.4	6.0	o	7.9
CDC Osler	67.7	6.50	10	15.5	67	3.1	8.5	1180	7.5	5.9	o+	7.4
PT 769	69.9	8.75	15	22.0	68	4.3	12.8	1190	7.8	6.0	o+	7.9

2011 Quality data of four check cultivars and PT769

Yr in Test	Test Wt	Ker Wt	Wheat Pro	Flour Pro	Pro Loss	FN	Amyl Peak	Clean Wht Flr Yld	Flr Yld PB 0.50 Ash	Flour Ash	Flour Color L*	Flour Color a*	Flour Color b*	Starch Dmg	PSI
	GUIDELINES			GUIDELINES			GUIDELINES			GUIDELINES			GUIDELINES		
Katepwa	81.4	36.3	13.6	12.9	0.7	410	450	74.9	76.5	0.46	94.0	0.53	9.9	8.4	56
CDC Teal	81.4	37.5	14.4	14.0	0.4	400	380	75.4	78.0	0.43	94.1	0.48	9.7	7.6	59
AC Splendo	80.4	36.9	14.7	13.9	0.8	425	520	75.1	75.5	0.48	94.3	0.47	9.3	7.2	58
CDC Osler	81.9	35.4	14.3	13.6	0.7	465	710	74.2	75.5	0.48	94.1	0.50	10.7	7.9	56
PT 769	80.5	40.7	14.4	13.7	0.7	390	410	73.1	77.0	0.45	94.4	0.48	9.3	8.2	55

	Farino Abs	Farino DDT	Farino MTI	Farino Stab	CSP Abs	CSP Pk Tme	CSP WHR /KG	CSP LV	CSP App	CSP Crumb Struct	CSP Crumb Modifiers[1]	CSP Color
Katepwa	67.7	4.75	15	13.0	68	3.2	5.9	1055	7.5	5.9	o+	7.4
CDC Teal	68.6	8.50	15	15.5	68	3.6	6.7	1165	7.8	5.9	o	7.7
AC Splendo	68.9	9.25	20	25.0	69	3.6	6.1	1110	7.8	5.9	o	7.7
CDC Osler	69.1	13.75	15	17.5	69	2.8	4.8	1085	7.9	5.8	o+	7.1
PT 769	72.0	7.50	15	20.5	74	3.3	6.6	1140	7.7	5.8	o	7.8

Table 5. Summary of PRCWRT QET votes regarding PT769, 2011 and 2012

		Support	DNO	Obj	Abstain	Reasons
PT769	2013					
PT769	2012	3	17	0	0	Imp FAB, CSP App and CrCol; Flag FlYld(.50)
PT769	2011	4	13	0	0	Exc FAB and CSP Abs, Imp CSP CrCol; Poor FlYld (cl.wt); exc noodle L*a*

Table 6. Supplementary disease data, Parkland B test 2010.

2010 U of A Parkland B Test																		
Stripe rust, bunt, FHB, leaf and stem rust																		
										FHB								
		Stripe Rust								**VRI**								
		soft dough/milk		jointing		soft dough												
		Pullman YR		Mt. Vernon YR				Manitoba FHB			Manitoba LR		Juvenile	Bunt Lethbridge				
Entry	**Pedigree**	**IT**	**%**	**IT**	**%**	**IT**	**%**	**INC**	**SEV**	**INDEX**	**Severity**	**Rating**	**SR**	All av	Class			
1	AC_Splendor	5	70	8	30	8	90	60	50	30	35	M	4	22	MS			
2	CDC_Teal	8	60	3	10	5	30	70	60	42	10	MR	4	15	I			
3	Katepwa	8	100	8	50	8	80	65	25	16.25	70	MSS	4	8	R/MR			
4	CDC_Osler	8	100	5	30	3	10	70	25	17.5	0	R	;1-	10	I			
11	**Intrepid/CDC_Go**	**3**	**30**	**5**	**20**	**3**	**20**	**40**	**30**	**12**	**0**	**R**	**3+**	**3**	**R/MR**			
* Infection Type (IT) for stripe rust was recorded based on the 0-9 scale with ITs 8 and 9 combined as 8 (the most susceptible reaction) in field data. Generally																		
IT 0-3 are considered resistant, 4-6 intermediate, and 7-9 susceptible. Heterogenous reactions of an entry were indicated by two or more ITs separated																		
by "," for most plants with the first IT and few plants with the second IT or connected with "-" for entries containing plants with continuous ITs.																		
** LOC04 was inoculated with spores collected from the same site in 2008.																		