CULTIVAR DESCRIPTION

CDC Raptor winter wheat

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Fowler, D. B. 2002. **CDC Raptor winter wheat**. Can. J. Plant Sci. **82**: 407–409. CDC Raptor is a high-yielding, lodging-resistant, semidwarf winter wheat (*Triticum aestivum* L.) with good winter hardiness. It has stem and leaf rust resistance that is similar to CDC Falcon and superior to all other winter wheat cultivars registered for production in western Canada. CDC Raptor is eligible for grades of the Canada Western Red Winter Wheat class.

Key words: *Triticum aestivum* L., cultivar description, wheat (winter).

Fowler, D. B. 2002. **Blé d'hiver CDC Raptor**. Can. J. Plant Sci. **82**: 407–409. CDC Raptor est une variété semi-naine de blé d'hiver (*Triticum aestivum* L.) résistante à la verse, à rendement élevé et d'une bonne rusticité. Elle se caractérise par une résistance à la rouille de la tige et des feuilles similaire à celle de CDC Falcon, mais est supérieure aux autres cultivars de blé d'hiver homologués pour l'ouest du Canada. CDC Raptor se prête au classement dans les catégories de blé rouge d'hiver de l'Ouest canadien.

Mots clés: *Triticum aestivum* L., description de cultivar, blé (hiver)

CDC Raptor is a high-yielding, rust-resistant, semidwarf winter wheat (*Triticum aestivum* L.) that was developed at the Crop Development Centre, University of Saskatchewan, Saskatoon, Saskatchewan. The Canadian Food Inspection Agency issued registration no. 5041 for CDC Raptor on 5 January 2000.

Breeding Methods and Pedigree

CDC Raptor was selected from the progeny of a cross S86-808/Abilene where S86-808 = Norstar*2/Vona (Welsh et al. 1978; Grant 1980; Roberts 1989). The final cross was made in 1988. The F_1 and F_2 generations were produced in a greenhouse. Head-to-row selection was applied to segregating generations from F_2 to F_8. F_3 and F_4 rows were evaluated in a field nursery at Saskatoon in 1989 and 1990 for winter hardiness, plant height, straw strength, disease reaction, and plant and kernel type. The F_5, F_6, and F_7 generations were grown under irrigation in a special nursery inoculated with leaf (*Puccinia recondita* Rob. ex Desm.) and stem (*Puccinia graminis* Pers. f. sp. *tritici* Eriks. & E. Henn) rust from 1991 to 1993, inclusive. Progeny of selected head rows were also evaluation in yield trials in Saskatchewan in 1992 and 1993. A F_7-derived F_8 selection, later designated S95-4, was evaluated for agronomic performance and disease reactions in trials grown in Saskatchewan in 1994 and 1995. S95-4 was entered into the Central Hard Red Winter Wheat Co-operative Tests in the fall of 1995 and was registered for production in Canada in 2000.

Performance

CDC Raptor had an average grain yield (Table 1) similar CDC Kestrel (Fowler 1997a), and CDC Clair (Fowler 1997b), the two cultivars that occupied 94% of western Canadian winter wheat acreage in 1999 (1999 Variety Survey, Canadian Wheat Board, Winnipeg, Canada). The winter hardiness of CDC Raptor was similar to that of CDC Falcon (Table 2, Fowler 1999). CDC Raptor headed 2 d later than CDC Falcon, 1 d later than CDC Kestrel and CDC

Table 1. Grain yield (t ha^{-1}) of CDC Raptor compared with that of CDC Kestrel, CDC Clair, CDC Osprey and CDC Falcon. Data from the Central Hard Red Winter Wheat Co-operative tests (1996–2000)[z]

	Alberta		Saskatchewan				
Cultivar	Southwest	Central	Brown soils	Parkland	Irrigation	Southeast Manitoba	Mean
CDC Kestrel	4.25	7.50	3.71	3.99	6.18	6.04	4.81
CDC Clair	4.13	7.79	3.82	4.11	5.82	5.74	4.83
CDC Osprey	4.03	7.51	3.71	4.13	5.58	5.56	4.72
CDC Falcon	4.08	8.05	3.71	3.69	7.07	6.20	4.87
CDC Raptor	4.15	7.65	3.77	3.95	6.77	5.82	4.86
LSD ($P \leq 0.05$)	0.30	0.48	0.12	0.15	0.43	0.34	0.13
No. of tests	5	6	12	16	5	5	49

[z]All means are weighted by the number of tests within a zone. Alberta locations included Lethbridge (Southwest), Olds and Lacombe (Central). Saskatchewan locations included Elrose and Saskatoon (Brown soils); Clair, Indian Head, Melfort, and Yorkton (Parkland); and Saskatoon (Irrigation). The Manitoba location was Winnipeg.

Table 2. Agronomic performance of CDC Raptor compared with that of CDC Kestrel, CDC Clair, CDC Osprey, and CDC Falcon. Data from the Central Hard Red Winter Wheat Co-operative tests (1996–2000)

Character	CDC Kestrel	CDC Clair	CDC Osprey	CDC Falcon	CDC Raptor	LSD ($P \leq 0.05$)	No. of tests
Winter survival (%)	95	98	98	94	92	5.9	5
Heading date (DOY)[z]	172	173	172	171	173	0.4	27
Maturity (DOY)[z]	216	216	214	213	216	0.9	30
Plant height (cm)	92	87	89	73	81	1.1	48
Lodging (0–9)[y]	2.6	2.3	1.0	0.1	0.3	0.72	7
Protein (%)	11.6	12.2	12.4	12.7	12.4	0.17	27
Protein yield (kg ha^{-1})	475	505	505	518	522	21.1	27

[z]Day of the year.
[y]0, all plants vertical; 9, all plants horizontal.

Table 3. Disease reactions of CDC Raptor compared with that of CDC Kestrel, CDC Clair, CDC Osprey, and CDC Falcon. Data from artificial rust infections at the University of Saskatchewan, Saskatoon (a and b) and the Plant Science Dept. University of Manitoba (W) using epidemic mixtures supplied by Agriculture and Agri-Food Canada in Winnipeg, and from a natural leaf rust epidemic at Clair, SK. (C). Common bunt data are from trials inoculated by Agriculture and Agri-Food Canada staff at Lethbridge, AB. Powdery mildew ratings were supplied by the Field Crop Development Centre, Alberta Agriculture

	CDC Kestrel	CDC Clair	CDC Osprey	CDC Falcon	CDC Raptor
(a) Stem Rust					
1996a	40 S	40 S	45 S	0 R	0 R
1996b	0 R	20 S	35 S	0 R	0 R
1997a	60 M	60 MS	40 MS	20 MR	20 R-MR
1997b	60 MS	40 S	50 S	0 R	0 R
1997W	40 S	45 S	45 S	0 R	0 R
1998a	40 MS	60 M	60 MS	10 MR	5 M
1998b	20 MS	65 S	65 S	0 R	0 R
1998W	10 MS	20 MS-S	50 S	10 MR-MS	5 R
1999a	40 MS	60 MS	40 MS	10 R-MR	5 R
1999b	5 MS	80 S	70 S	10 MR	10 R-MR
1999W	30 MS-40 S	40 S	50 S	10 MR	10 MR
2000a	40 MS	60 MS	40 MS	10 M	10 MR
2000b	30 M	35 MS-S	60 S	R	R
2000W	10 MS-S	70 S	70 S	10 MS	5 MR
(b) Leaf Rust					
1997a	45 S	40 S	35 S	5 MR	MS
1997C	20 S	15 S	50 S	5 M	20 MS
1997W	45 S	30 S	50 S	5 M	10 MS
1998a	20 MS	20 M	20 MS	TR	TR
1998b	40 MS	40 S	40 S	5 MR	10 MR
1998W	35 MS-S	55 S	60 S	40 S	10 MR
1999a	20 MS	20 M	40 MS	10 MR	10 MR
1999b	R	50 S	65 S	5 MR	10 MR
1999W	60 MS-S	35 MS-S	75 S	5 MR	5 MR
2000W	5 MS	5-10 MS-S	15-20 MS	Tr R-MR	Tr R-MR
(c) Common Bunt					
1997	73 VS	55 S	78 VS	60 S	62 VS
1998	68 VS	57 VS	68 VS	40 S	58 VS
(d) Powdery Mildew					
1997	5.0	6.0	6.1	4.0	5.3

[z]Percent infection and type of reaction: VS, very susceptible; S, susceptible; MS, moderately susceptible; MR, moderately resistant; TR, trace; R, resistant.

Osprey (Fowler 1997c), and the same time as CDC Clair. It matured 2 to 3 d later than CDC Osprey and CDC Falcon, and at the same time as CDC Kestrel and CDC Clair. Plant height of CDC Raptor was intermediate to CDC Falcon and the other check cultivars. The short, strong straw of CDC Raptor and CDC Falcon make them attractive options for farmers who direct-seed and direct-combine harvest. They also allow farmers in higher moisture regions to adopt nitrogen fertilizer strategies aimed at both high grain yield and protein concentration targets (Fowler 1992).

The leaf rust reaction of CDC Raptor was similar to that of CDC Falcon and superior to all other western Canadian winter wheat cultivars (Table 3). It had a stem rust reaction that was equal to CDC Falcon. CDC Raptor and CDC Falcon have given western Canadian farmers the first winter wheat options with leaf and stem rust resistance in the range

Table 4. Grain quality of CDC Raptor compared with that of CDC Clair and CDC Osprey. Data provided by K.P. Preston, Grain Research Laboratory, Canadian Grain Commission, Winnipeg, MB, from analyses of Central Hard Red Winter Wheat Co-operative test composites (1995–1996 and 1997–1998). American Association of Cereal Chemists methods were followed for determining the various end-use suitability traits

Character	CDC Clair	CDC Osprey	CDC Raptor
Test weight (kg hL^{-1})	82.4	83.0	83.8
Kernel weight (mg)	33.8	32.7	31.0
Wheat protein (%)	12.3	12.8	12.2
Flour protein (%)	11.4	11.9	11.1
Falling number (sec)	425	403	413
Amylograph peak viscosity (BU)	960	905	855
Flour yield (%)	73.4	75.9	75.0
Flour ash (%)	0.39	0.39	0.40
Flour color (Kent-Jones)	-2.4	–2.8	–2.6
Farinograph			
Absorption (%)	58.7	56.5	55.9
Dough development (min)	5.86	7.65	5.16
Stability (min)	15.1	17.4	10.9
Remix loaf volume (cm^3)	743	783	800

of adapted spring wheat cultivars. CDC Raptor is very susceptible to common bunt [*Tilletia laevis* Kuhn in Rabenh. and *T. caries* (DC.) Tul. & C. Tul.] and susceptible to powdery mildew (*Erysiphe grammis f.* sp. *tritici*).

CDC Raptor is eligible for grades of the Canada Western Red Winter Wheat class. It has a higher test weight than CDC Clair and CDC Osprey (Table 4). Its kernel weight was lower than the check cultivars and its flour yield approached that of CDC Osprey with a slightly higher flour ash. The protein concentration of CDC Raptor was lower than that of CDC Clair and CDC Osprey in the two composites made by the Grain Research Laboratory, Canadian Grain Commission, Winnipeg, Manitoba, from selected Central Hard Red Winter Wheat Co-operative tests in 1996 and 1998 (Table 4). However, the average protein concentration of CDC Raptor (12.4%) was the same as CDC Osprey (12.4%) and higher than CDC Clair (12.2%) when 27 station years of replicated Central Hard Red Winter Wheat Co-operative tests grown in Saskatchewan between 1996 and 2000 were evaluated (Table 2). In these trials, high grain yield potential and protein concentration combined to give CDC Raptor a grain protein yield that was higher than all of the currently registered winter wheat cultivars in western Canada. The physical dough properties of CDC Raptor have been rated as 'weak' while its loaf volume was higher than the checks.

Other Characteristics

PLANT. Winter growth habit; coleoptile colour purple; juvenile growth prostrate; leaves dark to blue green; flag leaf dark green, mid-wide, mid-long to long, intermediate to upright attitude; sheath and leaf blades glabrous; auricles white with few hairs; tillers many; straw short, internode hollow, culm neck straight, anthocyanin coloration at maturity absent.

SPIKES. Tapering to oblong, mid-dense, erect to inclined, mid-long, awned; glumes mid-wide, mid-long to long, glabrous, white; glume shoulders wanting, narrow; glume beak mid-long to long, acute to acuminate.

KERNEL. Medium red, hard, mid-size to small, short to mid-long, mid-wide, elliptical to ovate; cheeks slightly angular to rounded; brush hairs mid-size to small, short; crease mid-wide, shallow to mid-deep; germ small to mid-size, oval to oval.

Availability of Propagating Material

Breeder seed will be maintained by the Crop Development Centre, University of Saskatchewan, Saskatoon, Saskatchewan, Canada S7N 5A8. Western Canadian distribution and multiplication of pedigreed seed stocks are handled by SeCan Association, 201 - 52 Antares Drive, Ottawa, Ontario, Canada K2E 7Z1.

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Fowler, D. B. 1992. Cultivar development and selection. Winter wheat production manual. Ducks Unlimited Canada, Yorkton, SK. pp. 801–818.

Fowler, D. B. 1997a. CDC Kestrel winter wheat. Can. J. Plant Sci. **77**: 673–675.

Fowler, D. B. 1997b. CDC Clair winter wheat. Can. J. Plant Sci. **77**: 669–671.

Fowler, D. B. 1997c. CDC Osprey winter wheat. Can. J. Plant Sci. **77**: 666–667.

Fowler, D. B. 1999. CDC Falcon winter wheat. Can. J. Plant Sci. **79**: 599–601.

Grant, M. N. 1980. Registration of Norstar wheat. Crop Sci. **20**: 552.

Roberts, T. C. 1989. Hard winter wheat varieties of the 80's. Wheat Quality Council, Manhattan, KS.

Welsh, J. R., Ellis, G., Normann, R., Ball, W. S., Hinze, G. and Mann, H. 1978. Registration of Vona wheat. Crop Sci. **18**: 695.