

CDC Harrier winter wheat

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Fowler D.B. 1999. **CDC Harrier winter wheat**. Can. J. Plant Sci. **79**: 603–605. CDC Harrier is a winter-hardy, strong-strawed, semidwarf winter wheat (*Triticum aestivum* L.) with the high grain yield and agronomic performance of CDC Kestrel. CDC Harrier is the first winter wheat cultivar with a high level of stem rust resistance to be registered for production in western Canada. The grain quality characteristics of CDC Harrier are similar to those of CDC Kestrel. CDC Harrier is eligible for grades of the Canada Western Red Winter Wheat class.

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

Fowler D.B. 1999. **Nouveau cultivar de blé d'hiver CDC Harrier**. Can. J. Plant Sci. **79**: 603–605. CDC Harrier est un blé d'hiver (*Triticum aestivum* L.) demi-nain, rustique et à paille forte, affichant un rendement en grain et des performances agronomiques comparables à ceux de CDC Kestrel. C'est le premier cultivar de blé d'hiver à être homologué pour l'Ouest canadien qui soit doté d'un niveau élevé de résistance à la rouille noire. La qualité du grain est également semblable à celle de CDC Kestrel. Le nouveau cultivar est admissible dans la classe des blés d'hiver rouge de l'Ouest canadien.

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

CDC Harrier is a high-yielding, stem-rust-resistant, semi-dwarf 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. 4663 for CDC Harrier on 24 December 1997.

Pedigree and Breeding Method

CDC Harrier was selected from the progeny of a cross Norstar × 2/Vona made in 1979. The F₁ and F₂ generations were produced in a greenhouse. F₂-derived F₃ lines and F₃-derived F₄ lines were grown in the field where winter hardiness, height, straw strength, and plant and kernel type were

Table 1. Grain yield (t ha⁻¹) of CDC Harrier compared with Norstar, CDC Kestrel, CDC Clair, and CDC Osprey. Data from the Western and Central Hard Red Winter Wheat Cooperative tests (1993–98)^z

Cultivar	Alberta		Saskatchewan			Southeast Manitoba	Mean
	Southwest	Central	Brown soils	Parkland	Irrigation		
Norstar	3.58	6.94	3.16	3.88	4.77	4.93	4.24
CDC Kestrel	4.13	7.96	34.04	6.39	5.62	4.69	
CDC Clair	4.14	8.07	3.05	4.2	6.1	5.19	4.71
CDC Osprey	3.92	7.98	2.95	4.16	5.69	5.21	4.6
CDC Harrier	4.11	8.46	3.13	3.98	6.88	5.69	4.8
LSD ($P \leq 0.05$) ^y	0.16	0.47	0.1	0.15	0.49	0.32	0.12
No. of tests	5	5	8	19	5	4	46

^zAll means are weighted by the number of tests within a zone. Alberta locations included Lethbridge (Southwest) 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.

^yCultivar by trial MS were used to determine LSD.

Table 2. Agronomic performance of CDC Harrier compared with Norstar, CDC Kestrel, CDC Clair, and CDC Osprey. Data from the Western and Central Hard Red Winter Wheat Cooperative tests (1993–98)

Character	Norstar	CDC Kestrel	CDC Clair	CDC Osprey	CDC Harrier	LSD ($P \leq 0.05$) ^x	No. of tests
Winter survival (%)	98	95	98	98	97	3.3	5
Heading date (DOY) ^z	173	171	171	171	172	0.3	29
Maturity (DOY) ^z	216	215	215	214	216	0.4	33
Plant height (cm)	108	91	86	87	92	1.2	42
Lodging (0–9) ^y	6.8	3.1	3.8	2.1	2.1	0.71	15

^zDay of year

^y0, all plants vertical; 9, all plants horizontal

^xCultivar by trial MS were used to determine LSD.

Table 3. Disease reactions of CDC Harrier compared with Norstar, CDC Kestrel, CDC Clair, and CDC Osprey

	Norstar	CDC Kestrel	CDC Clair	CDC Osprey	CDC Harrier
a) <i>Stem rust</i> ^z					
1994	65S ^w	15MS	40MS	15MS	0R
1995a	60VS	60S	50S	60S	0R
1995b	75VS	20S	60S	50S	0R
1996a	80VS	40 S	40 S	45 S	15 MS
1996b	90VS	0 R	20 S	35 S	0 R
1997a	60MS	60 M	60 MS	40 MS	40 MR
1997b	95S	60 MS	40 S	50 S	10 M
1997W	55S	40 S	45 S	45 S	5 MR
1998a	60M	40 MS	60 M	60 MS	40 MR
1998b	80S	20 MS	65 S	65 S	5 MR
1998W	50S	10 MS	20 MS-S	50 S	20R-MR
b) <i>Leaf rust</i>					
1997a	40S	45 S	40 S	35 S	60 S
1997C	25S	20 S	15 S	50 S	15 S
1997W	20S	45 S	30 S	50 S	30 S
1998a	20MS	20 MS	20 M	20 MS	40 MS
1998b	30S	40 MS	40 S	40 S	20 MS
1998W	40S	35 MS-S	55 S	60 S	60 S
c) <i>Common bunt</i> ^y					
1996	20S	25VS	24S	32VS	29VS
d) <i>Powdery mildew</i> ^x					
1997	5.3	5	6	6.1	5.1

^zData from artificial leaf and stem 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, Saskatchewan (C).

^yCommon bunt data from trials inoculated by Agriculture and Agri-Food Canada staff at Lethbridge, Alberta.

^xPowdery mildew ratings supplied by the Field Crop Development Centre, Alberta Agriculture.

^wPercent infection and type of reaction: VS, very susceptible; S, susceptible; MS, moderately susceptible; MR, moderately resistant; R, resistant.

Table 4. Grain quality of CDC Harrier compared with CDC Kestrel, CDC Clair, and CDC Osprey^z

Character	CDC Kestrel	CDC Clair	CDC Osprey	CDC Harrier	LSD ($P \leq 0.05$) ^y	No. of tests
Test weight (kg hL ⁻¹)	81.4	82	81.9	80.8	0.71	3
Kernel weight (mg)	33.5	34.8	32.4	33.2	0.96	3
Wheat protein (%)	11.4	12.3	12.5	11.7	0.33	3
Starch damage (Farrand units)	22	23	20	23	1.8	3
Falling number (s)	375	373	385	370	49	3
Flour yield (%)	77	75.5	77.3	76.5	0.9	3
Flour ash (%)	0.4	0.42	0.42	0.42	0.02	3
Flour color (Kent-Jones)	-1.4	-1.3	-2	-1.4	0.5	3
Farinograph						
Absorption (%)	57.3	58.7	56.4	57.5	0.9	3
Dough development (min)	3.97	5.13	5.62	4.13	0.77	3
Stability (min)	6.9	9.2	13	7.5	2.9	3
Baking strength index	106.5	110.2	105.9	110	5.6	3
Remix loaf volume (cm ³)	745	798	807	757	36	3

^zData provided by K.P. Preston, Grain Research Laboratory, Canadian Grain Commission, Winnipeg, Manitoba, from analyses of Central Hard Red Winter Wheat Cooperative test composites (1993–1996). American Association of Cereal Chemists methods were followed for determining the various end-use suitability traits.

^yCultivar by Trial MS were used to determine LSD.

evaluated. Irrigation and dryland trials that were extensively damaged during the high stress winter of 1984–1985 identified the winter hardiness and straw strength of the GA-insensitive line later designated S86-15. The agronomic performance of S86-15 was evaluated in yield trials grown in western Canada from 1985–1986 to 1988–1989. Single plant selections were made from S86-15 in 1990. These selections were grown as head rows in an artificially

inoculated rust nursery under irrigation at Saskatoon where a single row, which was later designated as S93-1, was selected in 1991. The agronomic performance and disease reaction of S93-1 were evaluated in trials grown in Saskatchewan in 1992 and 1993. S93-1 was entered into the Central Hard Red Winter Wheat Co-operative Tests in the fall of 1993 and was registered for production in Canada in 1997.

Performance

CDC Harrier had an average grain yield (Table 1) that was 113% of Norstar (Grant 1980), the long-term check, and 102% of CDC Kestrel (Fowler 1997a), which occupied 82% of western Canadian winter wheat acreage in 1998 (1998 Variety Survey, Canadian Wheat Board, Winnipeg, Manitoba, Canada). The grain yield of CDC Harrier was 102% of CDC Clair (Fowler 1997b) and 104% of CDC Osprey (Fowler 1997c), two more recent winter wheat cultivar releases in western Canada.

The winter hardiness of CDC Harrier was similar to the check cultivars (Table 2). CDC Harrier headed 1 d later than CDC Kestrel, CDC Clair, and CDC Osprey and 1 d earlier than Norstar. It matured at the same time as Norstar and 1 to 2 d later than CDC Kestrel, CDC Clair, and CDC Osprey. CDC Harrier had a plant height that was similar to CDC Kestrel. The straw strength of CDC Harrier was similar to CDC Osprey, which is considerably stronger than Norstar.

The stem rust reaction of CDC Harrier was superior to all the winter wheat cultivars that are registered for production in western Canada (Table 3). It had a moderately susceptible-susceptible leaf rust reaction, which was similar to the check cultivars.

CDC Harrier is eligible for grades of the Canada Western Red Winter Wheat Class. It had a test weight that was 0.6 kg hL⁻¹ lower and a kernel weight that was similar to CDC Kestrel (Table 4). The flour yield of CDC Harrier was 0.5 and 0.8% lower than CDC Kestrel and CDC Osprey, respectively. CDC Harrier had a baking strength index that was higher than CDC Kestrel and CDC Osprey and its physical dough properties were similar to CDC Kestrel and weaker than CDC Osprey. The grain protein concentration of CDC Harrier was similar to CDC Kestrel and lower than CDC Clair and CDC Osprey.

Other Characteristics

PLANT. Winter growth habit; coleoptile color reddish; juvenile growth prostrate; leaves dark green; flag leaf dark green, mid-wide, mid-long, intermediate attitude; sheath

and leaf blades glabrous; auricles white with few hairs; many tillers; straw mid-long, internode hollow, culm neck straight, no anthocyanin coloration at maturity.

SPIKES. Tapering, mid-dense, semi-nodding, mid-long, awned; glumes mid-wide, mid-long to long, slightly pubescent, white; glume shoulders wanting, narrow; glume beak mid-long to long, 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, mid-long; crease mid-wide, shallow to mid-deep; germ small to mid-size, oval to ovate.

Maintenance and Distribution of Pedigreed Seed

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, 200 -57 Auriga Drive, Nepean, Ontario, Canada K2E 8B2.

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