

## Accipiter hard red winter wheat

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Fowler, D. B. 2011. **Accipiter hard red winter wheat**. *Can. J. Plant Sci.* **91**: 363–365. Accipiter is an intermediate height, high-yielding, winter wheat (*Triticum aestivum* L.) cultivar with good stem and moderate leaf rust resistance that is registered for production in western Canada. It is a hard red winter wheat cultivar that is eligible for grades of the Canada Western General Purpose (CWGP) wheat class. The CWGP class was created in 2007 to encourage the development of cultivars to fill the high energy demands of the biofuel and livestock feed markets in western Canada. The grain yield of Accipiter was 114% of the Canada Western Red Winter Wheat class grain quality check cultivar, CDC Osprey, and 103% of the high-yielding check, CDC Falcon. High grain yield potential combined with good agronomic and disease packages make Accipiter a good fit for the CWGP class.

**Key words:** *Triticum aestivum* L., cultivar description, hard red, wheat (winter), Canada Western General Purpose

Fowler, D. B. 2011. **Le blé roux vitreux d'hiver Accipiter**. *Can. J. Plant Sci.* **91**: 363–365. Accipiter est une variété de blé d'hiver (*Triticum aestivum* L.) de taille intermédiaire à haut rendement. Elle se caractérise par une bonne résistance à la rouille de la tige et une résistance moyenne à la rouille des feuilles, et est homologuée pour la culture dans l'Ouest canadien. Ce cultivar de blé roux vitreux d'hiver pourrait faire partie de la classe «Blé à des fins générales de l'Ouest canadien» (CWGP), créée en 2007 pour favoriser le développement de cultivars en mesure de répondre aux forts besoins en énergie des secteurs des biocarburants et de l'alimentation du bétail dans l'ouest du Canada. Le rendement grainier d'Accipiter équivaut à 114 pour cent de celui de CDC Osprey, le cultivar employé comme témoin pour la qualité du grain dans la classe du blé roux vitreux d'hiver de l'Ouest canadien, et à 103 pour cent de celui du témoin à haut rendement CDC Falcon. La possibilité d'un rendement grainier élevé associée à de bons paramètres agronomiques et à une bonne résistance à la maladie font qu'Accipiter convient très bien à la classe CWGP.

**Mots clés:** *Triticum aestivum* L., description de cultivar, blé roux, blé (hiver), blé à des fins générales de l'Ouest canadien

Accipiter hard red winter wheat (*Triticum aestivum* L.) was developed at the Department of Plant Sciences, University of Saskatchewan, Saskatoon, SK. The Variety Registration Office, Plant Production Division, Canadian Food Inspection Agency issued registration no. 6487 for Accipiter on 2008 Jul. 24.

### Pedigree and Breeding Method

Accipiter was selected from the progeny of a cross CDC Raptor/CDC Falcon that was made in 1999. Both CDC Raptor (Fowler 2002) and CDC Falcon (Fowler 1999) are registered Canada Western Red Winter Wheat cultivars. Doubled haploid lines were produced in the winter of 2000 and seed was increased during the fall and winter of 2000–2001 in a phytotron. These lines were then grown as rows in a nursery inoculated with leaf (*Puccinia recondita* Rob. ex Desm.) and stem (*Puccinia graminis* Pers. f. sp. *tritici* Eriks. & E. Henn) rust at Saskatoon where winter survival, lodging resistance, height, maturity, and disease reaction were evaluated. Accipiter was a row selection made in the fall of 2002 that was designated DH00-18-196. Its agronomic performance and disease reactions were assessed in yield trials grown in Saskatchewan in 2002–2003 and

2003–2004. DH00-18-196 was then evaluated in the Central Hard Red Winter Wheat Cooperative Registration trials in 2004–2005, 2005–2006, and 2006–2007.

Analyses of variance were conducted to determine the level of significance of differences due to cultivars and location years. The least significant difference (LSD) test was used to identify significance differences in the mean value of Accipiter compared with the check cultivars.

### Performance

Accipiter is a hard red winter wheat with a grain yield potential (Table 1) that is similar to CDC Falcon, the high-yielding check in the western Canadian Central Winter Wheat Cooperative Registration trials. It has plant height and lodging resistance that are similar to CDC Raptor (Table 2), which should make it an alternative for farmers in drier regions with more variable moisture conditions where the short stature of CDC Falcon has been a concern. Its time to heading and maturity falls between CDC Falcon and CDC Raptor. The rust response of Accipiter has been similar to CDC

**Abbreviation:** CWGP, Canada Western General Purpose

**Table 1. Grain yield of Accipiter compared with CDC Falcon, CDC Osprey, and CDC Raptor. Data was obtained from the Central Winter Wheat Co-operative Registration trials (2005–2007)<sup>z</sup>**

Cultivar	Alberta	Saskatchewan	Saskatchewan Irrigation <sup>y</sup>	Southern Manitoba	Mean
CDC Falcon	7341	4915	6558	4601	5608
CDC Osprey	6773	4565	5625	3928	5049
CDC Raptor	6932	4799	6002	4322	5325
Accipiter	7427	5099	7171	4617	5765
LSD ( $P=0.05$ )	370.0	321.9	770.9	375.0	194.0
No. of tests	7	10	3	8	28

<sup>z</sup>All means are weighted by the number of tests within a zone. Alberta locations included Lethbridge, Olds, and Lacombe. Saskatchewan locations were Saskatoon, Clair, Indian Head, Melfort, and Saskatoon irrigation. The Manitoba locations were Brandon, Winnipeg, and Carman.

<sup>y</sup>Stem and leaf rust nursery.

Falcon (Table 3), with perhaps better stem rust resistance (R-MS compared to R-S) and poorer leaf rust resistance (R-MR compared to R-MS). Accipiter has a S-VS bunt rating, which is similar to the check cultivars.

The average protein concentration of Accipiter was lower than that of CDC Falcon and similar to CDC Osprey (Fowler 1997) and CDC Raptor when data from 14 station years of replicated Central Hard Red Winter Wheat Co-operative Registration trials were evaluated (Table 2). In these trials, high grain yield potential resulted in a grain protein yield for Accipiter that was similar to CDC Falcon and significantly ( $P<0.05$ ) higher than CDC Raptor and CDC Osprey.

Best management practices are employed in the Central Winter Wheat Co-operative Registration trials with the result that the level of winter damage experienced is normally very low. However, CDC Osprey, CDC Raptor and CDC Falcon were included in 2008–2009 and 2009–2010 regional trials planted on summer-fallow fields with minimal snow trapping potential. The average winter survival of Accipiter (68%) was significantly lower than CDC Osprey (88%) and higher than CDC Raptor (58%) and CDC Falcon (56%) (LSD = 8.3,  $P=0.05$ ) in seven of these trials where winter damage was recorded.

Kernel visual distinguishably guidelines were in place when Accipiter entered the Central Winter Wheat Co-operative Registration trials. Accipiter did not meet the

kernel visual distinguishably standards for registration in western Canada one (2006) out of the three years of evaluation and as a result composite samples that were submitted to the Grain Research Laboratory, Canadian Grain Commission, Winnipeg, MB, were only assessed for grain quality in 2005 and 2006. It had a significantly ( $P<0.05$ ) higher flour ash and significantly lower flour color and Farinograph stability values than the Canada Western Red Winter Wheat class grain quality check cultivar, CDC Osprey (Table 4). Differences among all other end-use quality characters were non-significant.

Kernel visual distinguishably requirements were dropped in 2008. However, without the necessary grain quality data, Accipiter was not considered for registration in the Canada Western Red Winter Wheat class. The Canada Western General Purpose (CWGP) class was created in 2007 to encourage the development of cultivars to fill the high energy demands of the biofuel and livestock feed markets in western Canada. A 14% yield advantage over the Canada Western Red Winter Wheat grain quality check cultivar, CDC Osprey, and a 3% yield advantage over CDC Falcon, suggests that Accipiter will provide a good fit for the CWGP class.

### Other Characteristics

*Plant.* Winter growth habit; coleoptile colour reddish; juvenile growth prostrate; leaves medium green; flag leaf medium green, mid-wide, short, intermediate to upright

**Table 2. Agronomic performance of Accipiter compared with CDC Falcon, CDC Osprey and CDC Raptor. Data were obtained from the Central Winter Wheat Co-operative Registration trials (2005–2007)**

Character	CDC Falcon	CDC Osprey	CDC Raptor	Accipiter	LSD ( $P=0.05$ )	No. tests
Heading Date (DOY) <sup>z</sup>	170	172	173	172	0.6	23
Maturity (DOY) <sup>z</sup>	206	207	210	209	1.1	18
Plant Height (cm)	78	96	87	86	1.4	26
Lodging (1–9) <sup>y</sup>	1.9	2.7	1.9	2.3	0.53	8
Protein (%)	11.9	11.4	11.6	11.6	0.27	14
Protein yield (kg ha <sup>-1</sup> )	612	539	575	627	36.8	14

<sup>z</sup>Day of year.

<sup>y</sup>1, all plants vertical; 9, all plants horizontal.

**Table 3.** Disease reactions of Accipiter compared with CDC Osprey, CDC Falcon and CDC Raptor. Leaf and stem rust infections were obtained from artificially inoculated nurseries at the University of Saskatchewan, Saskatoon SK, and the Plant Science Department, University of Manitoba, Winnipeg, MB, using epidemic mixtures supplied by Agriculture and Agri-Food Canada in Winnipeg, MB. Stripe rust ratings were supplied by the Plant Science Department, University of Manitoba, the Field Crop Development Centre, Alberta Agriculture Lacombe AB, and Agriculture and Agri-Food Canada, Lethbridge, AB. Powdery mildew ratings were supplied by the Field Crop Development Centre, Alberta Agriculture, Lacombe, and Agriculture and Agri-Food Canada, Lethbridge. Tan spot ratings were supplied by Agriculture and Agri-Food Canada staff at Lethbridge. Common bunt data are from trials inoculated by Agriculture and Agri-Food Canada, Lethbridge

	CDC Osprey	CDC Falcon	CDC Raptor	Accipiter
<i>(a) Stem rust</i>				
2005W <sup>z</sup>	60S <sup>y</sup>	30MS	10MR	15MR/MS
2006W	80S/VS	15MS/S	5MR	5R/MR
2006S	90S	R	R	R
2007W	30S	5R	1R	1R
2007S	50S	R	R	R
<i>(b) Leaf rust</i>				
2005W	50S	5MR	15MR/MS	20MR/MS
2006W	5MS	5MR	5MR	5MR/MS
2007W	80S	30MR	15MR	15MR/MS
2007S	80S	5R	20MR	R
<i>(c) Stripe rust</i>				
2006W (1-4)	1.8	2.8	2.5	1.5
2006La (%)	90	45	43	70
2006Le (1-9)	3	1	2	1.5
<i>(d) Powdery Mildew</i>				
2005O (1-9)	6.2	4.1	5.6	4.7
2005Le (1-9)	4.1	3.7	4.7	4.0
2006Le (1-9)	5.0	4.0	5.0	4.0
2007Le (1-9)	4.3	4.3	4.3	2.7
<i>(f) Tan spot</i>				
2006Le (1-9)	1	5	3	5
<i>(g) Bunt</i>				
2005Le	87VS	68VS	89VS	72VS
2006Le	70VS	56VS	67VS	60VS
2007Le	65VS	69VS	57VS	37S

<sup>z</sup>S, Saskatoon; IH, Indian Head; W, Winnipeg; C, Carman; La, Lacombe; Le, Lethbridge; O, Olds.

<sup>y</sup>Percent infection and type of reaction: VS, very susceptible; S, susceptible; MS, moderately susceptible; MR, moderately resistant; R, resistant.

attitude; sheath and leaf blades glabrous; auricles light red, slightly pubescent; tillers many; straw medium tall, internode hollow, culm neck slightly curved, anthocyanin coloration at maturity absent.

**Spikes.** Tapering, lax to mid-dense, erect to inclined, mid-long to long, awned; glumes mid-wide, mid-long, glabrous, white; glume shoulders square, narrow to mid-wide; glume beak short, acuminate.

**Kernel.** Red, hard, small to mid-size, elliptical and ovate; cheeks rounded to angular; brush midsize, mid-long; crease mid-wide, shallow; germ small, oval.

**Table 4.** Wheat and flour analytical data for Accipiter compared with CDC Osprey. End-use quality testing conducted by the Grain Research Laboratory of the Canadian Grain Commission on composite samples from the 2005 and 2006 Central Winter Wheat Co-operative Registration Trials. American Association of Cereal Chemists methods were followed for determining the various end-use suitability traits

Character	CDC Osprey	Accipiter	LSD ( <i>P</i> = 0.05)
Test weight (kg hL <sup>-1</sup> )	81.7	83.2	NS
Kernel weight (mg)	29.0	30.5	NS
Wheat protein (%)	11.3	11.2	NS
Flour Protein (%)	10.4	10.3	NS
Protein Loss (%)	0.9	0.9	NS
Falling number (sec)	350	378	NS
Amylograph peak viscosity (BU)	515	575	NS
Flour yield (%)	76.7	75.3	NS
Flour ash (%)	0.41	0.43	0.013
Flour colour Agtron	89.0	82.5	6.36
Starch damage (megazm)	5.5	6.0	NS
Particle size index (%)	62	58	NS
Remix loaf volume (cm <sup>3</sup> )	778	768	NS
Test bake absorption (%)	58	59	NS
Test bake mixing time (min)	2.9	4.1	NS
Farinogram absorption (%)	55.4	57.3	NS
Farinogram DDT <sup>z</sup> (min)	5.7	4.3	NS
Farinogram MTP <sup>y</sup> (BU)	15	23	NS
Farinogram Stability (min)	13.0	10.0	1.27

<sup>z</sup>Dough development time.

<sup>y</sup>Mixing tolerance index.

NS, non-significant differences.

### Maintenance and Distribution of Pedigreed Seed

Breeder seed will be maintained by the Department of Plant Sciences, University of Saskatchewan, Saskatoon, Saskatchewan, Canada S7N 5A8. Distribution and multiplication of pedigreed seed stocks are handled by SeCan Association, 501-300 March Rd., Kanata, Ontario, Canada K2E 2E2.

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