CULTIVAR DESCRIPTION

AC Corinne hard red spring wheat

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Humphreys, D. G., Townley-Smith, T. F., McKenzie, R. I. H. and Czarnecki, E. 2001. **AC Corinne hard red spring wheat**. Can. J. Plant Sci. **81**: 741–743. AC Corinne is a hard red spring wheat belonging to the Canada Western Extra Strong (CWES) class. It has superior preharvest sprouting resistance and improved leaf rust resistance compared to Glenlea and Wildcat, and is higher yielding than Wildcat. AC Corinne has extra strong wheat quality similar to Glenlea combined with higher grain protein content. It is adapted to the wheat growing areas of the prairie provinces.

Key words: *Triticum aestivum* L., Canada Western Extra Strong, hard red spring wheat, cultivar description, yield, disease resistance

Humphreys, D. G., Townley-Smith, T. F., McKenzie, R. I. H. et Czarnecki, E. 2001. **Blé tendre roux de printemps AC Corinne.** Can. J. Plant Sci. **81**: 741–743. AC Corinne est un blé tendre roux de printemps qui appartient à la classe Extra Fort de l'Ouest Canadien. AC Corinne est résistance à la germination précoce et a une résistance contre la rouille des feuille supérior comparé à celle des cultivars Glenlea et Wildcat. De plus, AC Corinne a un rendement en grains plus élevés que Wildcat. AC Corinne posséde une qualité de grain semblable à Glenlea mais avec une teneure en protéine plus élevé. Ce cultivar est adapté aux zones du culture du blé des provinces canadiennes de l'Ouest.

Mots clés: *Triticum aestivum* L., blé extra fort de l'ouest canadien, blé tendre roux de printemps, description de cultivar, rendement, résistance aux maladies

AC Corinne, extra strong hard red spring wheat (*Triticum aestivum* L.), was developed at the Cereal Research Centre, Agriculture and Agri-food Canada, Winnipeg, Manitoba, Canada R3T 2M9. It received registration No. 5010 from the Canadian Food Inspection Agency on 22 November 1999.

Pedigree and Breeding Method

AC Corinne was selected from the backcross: Glenlea*6/RL 4137, where RL 4137, a preharvest sprouting resistant line, was derived from the cross: Frontana/4/McMurachy// Exchange/3/2*Redman /5/Thatcher*6/Kenya Farmer. The final backcross was made in 1976. The BC_5 F_1 and F_2 seeds were produced in growth cabinets. The BC_5 F_1 plants were chosen based on the preharvest sprouting resistance (PHSR) of their corresponding BC_4F_2 progeny. The BC_5F_3 bulks were grown in the 1978 Glenlea Hybrid Nursery (HN) and selected for disease resistance, straw strength and desirable agronomic traits. Superior lines were harvested and BC_5F_3-derived F_4 lines were increased in the greenhouse and further selection was made based on superior test weight, seed weight and falling number. BC_5F_5 lines were grown in the 1979 HN and 8 heads were taken from the superior rows. BC_5F_5-derived F_6 lines were increased in a growth cabinet. Plants with superior PHSR within each F_6 line were bulk harvested and each line grown as a single F_7 row in the 1980 HN. The lines were yield-tested in the F_8 to F_{11} generations with leaf rust (caused by *Puccinia recondita* f.sp.*tritici* Roberge ex Desmaz) and stem rust (caused by *Puccinia graminis* f. sp. *tritici* Eriks. & Henn.) reactions assessed concurrently in hill plots in a leaf and stem rust epiphytotic nursery at the Glenlea Field Station of the Cereal Research Centre. One of these BC_5F_5-derived F_{11} lines was designated 84TRR125. In 1988, 84TRR125 was yield-tested in the CPS Preliminary Test. Ten heads were tested for PHSR in a rain simulator. Three heads did not sprout and were evaluated for agronomic desirability as head rows in the 1989 Glenlea HN. A line designated Key 132 was yield-tested in the 1990 CPS Preliminary Test at Glenlea and Portage, Manitoba. This line was increased in the 1991–1992 New Zealand winter nursery and yield-tested in 1992 at Glenlea, Manitoba in the CPS Preliminary Test under the designation 92W537. In 1993, 92W537 was evaluated in the Canada Western Extra Strong Red 'A' test and in 1994 the line was entered in the Eastern Prairie Wheat 'B' yield test. From 1995 to 1997, AC Corinne was evaluated in the Canada Western Extra Strong Cooperative Test under the designation ES 7.

As part of the cooperative testing, leaf and stem rust reactions were evaluated in an epiphytotic nursery. The leaf rust races used were those multiplied from collections made the previous year (Kolmer 1994). The stem rust races included: QTH, TPM, TMR, RHT and RKQ. The races of loose smut [caused by *Ustilago tritici* (Pers.) Rostr.] included: T2, T9, T10 and T39 and the races of common bunt [caused by *Tilletia laevis* Fuhn in Rabenh. and *T. caris* (DC.)Tul. & C. Tul.] included: L1, L16, T1, T6, T13 and T19. Race designations are described by Roelfs and Martens (1988) for stem

Table 1. Average grain yield (>00 kg ha^{-1}) for AC Corinne and check cultivars in the CWES Wheat Cooperative Test, 1995–1997

	1995				1996				1997				Grand
Cultivar	Zone 1[z]	Zone 2[y]	Zone 3[x]	Mean	Zone 1	Zone 2	Zone 3	Mean	Zone 1	Zone 2	Zone 3	Mean	mean
Glenlea	36.8	41.2	45.4	40.0	36.1	38.9	50.3	39.6	33.8	38.7	46.2	38.0	39.2
Wildcat	29.3	36.4	39.8	34.0	32.4	37.5	52.2	37.8	28.6	38.9	49.9	36.7	36.1
AC Corinne	33.0	39.9	40.1	37.1	34.9	38.6	50.2	38.9	32.9	36.7	47.5	36.9	37.6
$LSD_{0.05}$	3.8	3.5	4.8	2.2	5.1	2.4	4.8	2.4	3.4	2.4	9.8	2.3	2.6
No. tests	5	5	2	12	5	5	2	12	5	6	2	13	37

[z]Zone 1: Brandon (1997), Elgin, Glenlea (1995, 1996), Indian Head, Morden (1997), Portage la Prairie (1995, 1996), Rosebank.
[y]Zone 2: Elrose, Lethbridge, Regina (lost in 1996), Scott, Swift Current, Watrous (1996, 1997).
[z]Zone 3: Grande Prairie (1995), Ellerslie, Beaverlodge (1996, 1997).

Table 2. Averages for agronomic characters of AC Corinne and check cultivars in the CWES Wheat Cooperative Test, 1995–1997

Cultivar	Maturity (d)	Lodging (1–9)[z]	Height (cm)	Test weight (kg hL^{-1})	1000-kernel weight (g)
Glenlea	100.6	3.6	100.3	78.1	40.9
Wildcat	96.6	2.1	88.1	76.6	37.3
AC Corinne	102.0	3.4	99.9	77.9	41.9
$LSD_{0.05}$	3.6	0.6	3.9	0.8	1.3
No. tests	31	21	34	38	38

[z]1 = no lodging, 9 = completely flat.

Table 3. Protein concentration[z] and Hagberg falling numbers (FN)[y] for AC Corinne and check cultivars based on the CWES Wheat Cooperative test composites and sprouting tests, 1995–1997

	1995		1996		1997		Mean	
	Protein (g hg^{-1})	FN (Sec)	Protein (g hg^{-1})	FN (Sec)	Protein (g hg^{-1})	FN (Sec)	Protein (g hg^{-1})	FN (Sec)
Glenlea	12.9	153	12.8	146	12.8	155	12.8	151
Wildcat	13.2	120	14.2	141	14.0	123	13.8	128
AC Corinne	13.1	255	13.2	263	13.1	188	13.1	235
$LSD_{0.05}$[x]							0.6	58

[z]Protein (13.5% moisture basis) was determined on a whole-wheat basis by the Grain Research Laboratory (Winnipeg, MB) on a composite of 4–7 locations each year used to assess grain quality.
[y]Falling number was performed according to AACC method 56-81B on UDY mill ground grain that had been weathered for approximately 48 h in a rain simulator.
[x]Because values for each year represent a single determination on a composite sample, LSD values were calculated only for the means over years by treating years as replicates.

Table 4. Summary of disease reactions of AC Corinne and check cultivars grown in the CWES Wheat Cooperative Tests, 1995–1997, one test per year except for leaf spots

Cultivar		Stem rust[z]	Leaf rust[z]	Loose smut[z]	Common bunt[z]	*Septoria nodorum*[x]	*Septoria tritici*[x]	Leaf spots (1997 only)[w]	FHB index[y]	Tan spot[x]	Common root rot (%)
Glenlea	1995	30 RMR	10 R	R	16 S	4–5	3	–	39.5	3-4	0.0
	1996	5 M	5 M	R	12 R	4.0	5.0	–	51.6	6.7	5.3
	1997	20 M	20 M	R	30 I	–	–	9 MS	77.0	–	9.3
Wildcat	1995	60 MR-MS	60 S	–	33 S	3	3	–	54.0	3-4	0.0
	1996	20 MRMS	70 MSS	R	60 S	5.8	7.7	–	62.5	7.2	5.3
	1997	3 RMR	60 MR-S	R	89 S	–	–	10 S	78.0	–	8.0
AC Corinne	1995	20 RMR	5 R	R	9 I	3	3	–	41.3	5	0.0
	1996	2 R	T R	R	32 I	3.0	5.3	–	62.7	7.2	8.0
	1997	1 R	10 M	R	22 I	–	–	8 MS	90.0	–	6.7

[z]Percent infection and/or type of reaction: TR, trace resistant; R, resistant; MR, moderately resistant; M, intermediate resistance, MS, moderately susceptible; S, susceptible; I, intermediate.
[y]Fusarium head blight index: (% infected spikelets × % infected heads)/100.
[x]*Septoria nodorum*, *Septoria tritici*, and Tan Spot rating : (1995: 1–2 = resistant; 3 = intermediate; 4–5 = susceptible; 1996: 1–3 = resistant; 4–6 = intermediate; 7–9 = susceptible).
[w]McFadden's Scale: 0–1 = resistant; 2–4 = moderately resistant; 5–6 = intermediate; 7–9 = moderately susceptible; 10–11 = susceptible.

rust; Long and Kolmer (1989) for leaf rust; Neilsen (1987) for loose smut and Hoffman and Metzger (1976) for common bunt.

Performance

AC Corinne was 4.2% higher yielding than Wildcat but 4.1% lower yielding than Glenlea over three years in the Canada Western Extra Strong Wheat Cooperative Test (Table 1). AC Corinne has greater seed weight (Table 2), superior preharvest sprouting resistance, i.e., a high falling number (Table 3) and improved leaf and stem rust resistance (Table 4) compared to both Glenlea and Wildcat. It is similar to Glenlea in height, lodging, test weight but matured on average 1.4 days later than Glenlea and 5.4 days later than Wildcat (Table 2). AC Corinne had a 2.3% higher grain protein content than Glenlea and 5.3% lower grain protein than Wildcat over three years in the Canada Western Extra Strong wheat Cooperative Test (Table 3).

Other Characteristics

Spikes. Fusiform, lax, long, inclined, apically awnletted; glumes mid-wide, long, glabrous, white to yellow colour at maturity; glume shoulders primarily square, mid-wide, glume beak short and acute.

Kernel. Red, large size, mid-wide, long, elliptical; cheeks slightly angular; brush hairs mid-long; brush size medium; embryo mid-size and oval.

Disease reaction. AC Corinne is resistant to moderately resistant to prevalent races of leaf and stem rust; resistant to loose smut; and has intermediate resistance to common bunt (Table 4). AC Corinne is similar to Glenlea in resistance to *Septoria nodorum* [caused by *Phaeosphaeria nodorum* (E. Müller) Hedjaroude (anamorph, *Stagonospora nodorum* (Berk.) Castellani and E.G. Germano)] and *Septoria tritici* [caused by *Mycosphaerella graminicola* (Fuckel) J. Schröt in Cohn (anamorph, *Septoria tritici* Roberge in Desmaz)]. It appears to be similar to Wildcat in resistance to Fusarium head blight (caused by *Fusarium* ssp.) and Tan Spot [caused by *Pyrenophora tritici-repentis* (Died.) Drechs. (anamorph, *Drechslera tritici-repentis* (Died.) Shoemaker)].

E*nd-use suitability*. Eligible for grades of the Canada Western Extra Strong wheat class.

Maintenance and Distribution of Pedigreed Seed

The 132 breeder lines were selected from F_{12}-derived F_{18} random plants in 1995. They were grown in 3-m rows in isolation at the Glenlea Field Station of the Cereal Research Centre in 1996, and as 15-m rows at the AAFC Seed Increase Unit, Indian Head, Saskatchewan in 1997 and 1998. Breeder seed will be maintained by the Agriculture and Agri-Food Canada Seed Increase Unit, Indian Head, Saskatchewan, Canada S0G 2K0. Distribution and multiplication of pedigreed seed stocks will be handled by Performance Seeds Ltd., 422 McDonald St. Box 35028, Regina, Saskatchewan, Canada S4X 4C6.

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Hoffmann, J. A. and Metzger, R. J. 1976. Current status of virulence genes and pathogenic races of the wheat bunt fungi in the northwestern USA. Phytopathology **66**: 657–660.

Kolmer, J. A. 1994. Physiologic specialization of *Puccinia recondita* f.sp. *tritici* in Canada in 1993. Can. J. Plant Pathol. **16**: 326–328.

Long, D. L. and Kolmer, J. A. 1989. A North American system of nomenclature for *Puccinia recondita* f.sp.*tritici*.. Phytopathology **79**: 525–529.

Nielsen, J. 1987. Races of *Ustilago tritici* and techniques for their study. Can. J. Plant Pathol. **9**: 91–105.

Roelfs, A. P. and Martens, J. W. 1988. An international system of nomenclature for *Puccinia graminis* f. sp. *tritici*. Phytopathology **78**: 525–533.