

AC Barrie hard red spring wheat

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McCaig, T. N., DePauw, R. M., Clarke, J. M., McLeod, J. G., Fernandez, M. R. and Knox, R. E. 1996. **AC Barrie hard red spring wheat**. *Can. J. Plant Sci.* **76**: 337–339. AC Barrie hard red spring wheat is adapted to the Canadian prairies. It combines high grain yield with high protein content. It is slightly shorter with stronger straw than Katepwa and Laura, and has resistance to leaf and stem rust, common bunt, and loose smut.

Key words: *Triticum aestivum*, spring wheat, cultivar description

McCaig, T. N., DePauw, R. M., Clarke, J. M., McLeod, J. G., Fernandez, M. R., et Knox, R. E. 1996. **Nouveau cultivar de blé roux vitreux de printemps AC Barrie**. *Can. J. Plant Sci.* **76**: 337–339. Le nouveau cultivar de blé roux vitreux de printemps AC Barrie est adapté aux conditions de culture des Prairies canadiennes. Il allie à une forte productivité grainière une haute teneur en protéine. Sa paille est légèrement plus courte et plus forte que celle de Katepwa et de Laura et il est doué de résistance à la rouille des feuilles et à la rouille noire ainsi qu'à la carie commune et au charbon nu.

Mots clés: *Triticum aestivum*, blé de printemps, description de cultivar

AC Barrie, hard red spring wheat (*Triticum aestivum* L.), was developed at the Agriculture and Agri-Food Canada Research Centre, Swift Current, Saskatchewan, by the Arid Prairie Wheat Program. It received registration No. 3980 from the Food Production and Inspection Branch of Agriculture and Agri-Food Canada on 16 August 1994.

Pedigree and Breeding Method

AC Barrie derives from the cross Neepawa/Columbus/BW90 made in 1984. Neepawa, Columbus, and BW90 were developed at the Agriculture and Agri-Food Canada Research Centre, Winnipeg, MB. A modified pedigree breeding procedure was used to select for the desirable traits. The F₂ seed was inoculated with common bunt and grown as individual plants in a leaf and stem rust epiphytotic nursery. The F₃, F₅ and F₇ generations were grown as head rows in a winter nursery near Brawley, California to multiply seed for early generation yield tests. Agronomic performance of experimental lines was measured in the F₄, F₆, and F₈ generations in replicated trials at two locations. A seed sample from the yield trials was used to assess grain quality and kernel characteristics. The F₈ was screened for reaction to both loose smut and common bunt. Reaction to leaf and stem rust was measured in an epiphytotic nursery near Glenlea, MB. The stem rust races used were: QCC, QTH, TPM, TMR, RHT, and RKQ. The races of leaf rust used were those described by Kolmer (1993, 1994). Races T2, T10 and T39 of loose smut and L1, L16, T1, T6, T13, and T19 of common bunt were used for screening. The race designations are those described by Roelfs and Martens (1988) for stem rust, Long and Kolmer (1989) for leaf rust, Hoffmann and Metzger (1976) for common bunt and

Nielsen (1987) for loose smut. The 126 breeder lines, grown in isolation near Swift Current, SK in 1992 and in 15-m rows near Indian Head, SK in 1993, derive from random plants from an F₆ derived F₁₁ single plant progeny row.

Performance

In 3 yr of testing in the Western Bread Wheat Cooperative Test, AC Barrie yielded an average of 6% more than Neepawa, 4% more than Katepwa, 6% more than AC Eatonia and 1% less than Laura (Table 1). The yield advantage of AC Barrie was greater at locations in the Dark Brown soil zone than locations in the Brown soil zone. In 1993, AC Barrie was evaluated in the Central Bread Wheat Cooperative Test (Table 2). The yield of AC Barrie was similar to that of Roblin, but exceeded Columbus by 6%, Katepwa by 10%, and Neepawa by 16%.

The protein content of AC Barrie was 0.3% greater than AC Eatonia, 0.4% greater than Neepawa and Katepwa, and 0.5% greater than Laura when averaged over the 3 yr in the Western Bread Wheat Cooperative Test (Table 3). In the 1993 Central Bread Wheat Cooperative Test, the protein content of AC Barrie was similar to that of Roblin but greater than Neepawa, Katepwa or Columbus.

The time-to-maturity of AC Barrie is 1 to 3 d longer than Neepawa and Katepwa, 2 d earlier than Columbus, and slightly earlier than Laura. AC Barrie has shorter and stronger straw than all check cultivars in the Western and Central Bread Wheat Cooperative Tests except Roblin. It also has a larger kernel and higher test weight than other cultivars (Table 2).

AC Barrie is resistant to prevalent races of leaf rust, stem rust, and common bunt, and moderately resistant to prevalent races of loose smut (Table 4).

Table 1. Grain yield and agronomic characteristics of AC Barrie and check cultivars based on data from the Western Bread Wheat Cooperative Test, 1991-1993

Cultivar	Grain yield (t ha ⁻¹)			Days to mature			Height (cm)	Lodging ^x (1-9)	Test wt (kg hL ⁻¹)	Kernel wt (mg)
	Zone 1 ^z	Zone 2	Mean ^y	Zone 1	Zone 2	Mean				
Neepawa	36.2	37.6	37.3	105.1	106.5	106.3	97	2.3	79.4	32.9
Katepwa	35.9	38.5	37.9	104.7	105.9	105.7	97	2.2	79.4	33.1
Laura	36.7	41.0	40.0	107.6	109.0	108.7	95	2.9	79.2	33.2
AC Eatonia	35.1	38.1	37.4	105.6	107.9	107.5	95	3.1	79.9	33.4
AC Barrie	36.4	40.5	39.6	106.6	108.3	108.0	93	1.6	79.9	36.0
LSD (P=0.05)			1.3			0.7	1	0.5	0.4	0.7
Station-years	6	21	27	3	15	18	27	13	26	26

^zZone 1 locations included Swift Current and Stewart Valley (SK) in the Brown soil zone; Zone 2 locations

included Regina, Scott, Saskatoon, Elrose, and Watrous in Saskatchewan and Acme and Lethbridge in Alberta in the Dark Brown soil zone.

^yAll means are weighted by the number of tests within a zone.

^x1 = no lodging, 9 = completely lodged.

Table 2. Grain yield, protein, agronomic characteristics and falling number (FN) of AC Barrie and check cultivars based on data from the Central Bread Wheat Cooperative Test, 1993

Cultivar	Yield (t ha ⁻¹)	Protein ^z (%)		Mature (d)	Height (cm)	Lodging ^y (1-9)	Test wt. (kg hL ⁻¹)	Kernel wt. (mg)	FN (s)
		Kernel	Flour						
Neepawa	30.4	13.3	12.6	109.1	108	2.9	74.9	29.0	265
Katepwa	32.1	13.1	12.7	109.1	109	3.1	75.2	30.8	285
Columbus	33.4	13.9	13.3	115.1	114	2.1	76.1	34.5	330
Roblin	34.9	14.2	13.8	109.4	98	2.0	74.3	32.6	315
AC Barrie	35.5	14.2	13.7	112.9	104	2.0	76.9	36.7	380
LSD (P=0.05)	2.5			1.5	2.2	0.7	1.1	1.4	
Locations	10	9	10	5	10	10			

^zProtein (13.5% moisture basis) and falling number were determined by the Grain Research Laboratory (Winnipeg, MB) on a composite of 4 locations used to assess grain quality.

^y1 = no lodging, 9 = completely lodged.

Table 3. Percent protein content and falling number (FN) of AC Barrie and check cultivars based on data from the Western Bread Wheat Cooperative Test, 1991-93^z

Cultivar	1991		1992		1993		Mean	
	Protein	FN	Protein	FN	Protein	FN	Protein	FN
Neepawa	14.3	410	13.8	400	12.8	390	13.6	400
Katepwa	14.1	410	13.7	390	12.9	420	13.6	403
Laura	14.0	395	13.4	375	13.0	380	13.5	383
AC Eatonia	14.0	390	13.6	405	13.4	385	13.7	388
AC Barrie	14.4	425	14.0	400	13.7	405	14.0	410
LSD ^y (P = 0.05)							0.39	21

^zProtein (%) (13.5% moisture basis) and falling numbers were 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.

^ySince 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.

Other Characteristics

SPIKES. Fusiform to oblong, mid dense, mid long, erect, apically awnleted; glumes mid-wide, mid-long, glabrous, white; glume shoulders square to elevated, some slightly rounded, mid-wide; glume beak short, acute.

KERNEL. Colour red, mid-size, mid-long, mid-wide, oval to ovate; cheeks angular; brush mid-size with mid short-hairs; embryo mid-size, oval.

SHATTERING. Resistant, similar to Katepwa.

DISEASE REACTION. Resistant to prevalent races of common bunt [caused by *Tilletia laevis* Kuhn in Rabenh., and *T. caries* (DC.) Tul.& C. Tul.], leaf rust (caused by *Puccinia recondita* Roberge ex Desmaz.) and stem rust (caused by *P. graminis* Pers.: Pers.), moderately resistant to loose smut [caused by *Ustilago tritici* (Pers.) Rostr.] and common root rot [caused primarily by *Bipolaris sorokiniana* (Sacc. in Sorok.) Shoemaker].

Table 4. Disease reactions of AC Barrie and check cultivars based on data from Western Bread Wheat Cooperative Test (1991-93)

Cultivar	Year	Leaf rust ^z (%)	Stem rust ^{z,y} (%)	Common bunt ^z (%)	Loose smut ^{z,x} (%)	Common root rot ^w (%)
Neepawa	1991	30MR		22I	7R	37
	1992	50MR	30MR	10I	0R	25
	1993	20MR	10R	11R	9R	3
Katepwa	1991	20MR		21I	13MR	29
	1992	50MR	20RMR	10I	0R	25
	1993	20MR	10R	11R	4R	3
Laura	1991	10I		56S	57S	20
	1992	10I	30RMR	26S	62S	18
	1993	5I	5VR	31S	17S	17
AC Eatonia	1991	5MR		3R	43MS	38
	1992	10M	20RMR	4R	68S	33
	1993	30MR	10RMR	2R	19MS	13
AC Barrie	1991	20R		3R	25MR	35
	1992	5VR	40RMR	9I	24MR	29
	1993	5R	10R	5R	15MR	8

^zPercent infection and type of reaction: VR, very resistant; R, resistant; MR, moderately resistant; I, intermediate resistant; MS, moderately susceptible; S, susceptible; HS, highly susceptible.

^yNo stem rust data available for 1991.

^xLoose smut percent infection is based on artificial inoculation.

^wPercentage of plants with moderate to large lesions on the subcrown internode.

PREHARVEST SPROUTING. Harvest-time falling numbers indicate that AC Barrie has tolerance similar to AC Eatonia, Neepawa, and Katepwa and better than Laura (Table 3).

PHOTOPERIOD RESPONSE. Sensitive.

END-USE SUITABILITY. Eligible for grades of the Canada Western Red Spring wheat class. AC Barrie exhibited superior overall quality with superior ratings for protein, flour yield, and loaf volume.

Maintenance and Distribution of Pedigreed Seed

Breeder seed will be maintained by the Seed Increase Unit of the Research Farm at Indian Head, SK S0G 2K0. Plant Breeders' Rights have been requested. Distribution and multiplication of pedigreed seed stocks will be handled by SECAN Association, 200-57 Auriga Drive, Nepean, Ontario, Canada K2E B8Z.

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