

AC Certa spring triticale

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McLeod, J. G., Pfeiffer, W. H., DePauw, R. M. and Clarke, J. M. 1996. **AC Certa spring triticale**. Can. J. Plant Sci. **76**: 333–335. AC Certa, a spring triticale cultivar (*X Triticosecale* Wittmack) was developed at CIMMYT and introduced by the Semiarid Prairie Agricultural Research Centre, Research Branch, Agriculture and Agri-Food Canada, Swift Current, via the 21st ITSN in 1989. It is widely adapted to the Prairie Provinces. AC Certa represents a significant improvement in test weight. AC Certa has an improved Hagberg Falling Number which is usually associated with improved harvest-time sprouting resistance. AC Certa is very resistant to the prevalent races of stem rust (caused by *Puccinia graminis* Pers. f. sp. *tritici* Eriks. and E. Henn.); leaf rust (caused by *P. recondita* Rob. ex Desm. f. sp. *tritici*); highly resistant to common bunt [caused by *Tilletia foetida* (Wallr.) Liro and *T. caries* (DC) Tul.], and resistant to common root rot [caused primarily by *Bipolaris sorokiniana* (Sacc. in Sorok.) Shoemaker].

Key words: Cultivar description, test weight, sprouting resistance, triticale (spring, *X Triticosecale* Wittmack)

McLeod, J. G., Pfeiffer, W. H., DePauw, R. M. et Clarke, J. M. 1996. **Nouveau cultivar de triticale de printemps AC Certa**. Can. J. Plant Sci. **76**: 333–335. AC Certa est un cultivar de triticale de printemps (*X Triticosecale* Wittmack) sélectionné au CIMMYT et introduit au Canada en 1989 par le Centre de recherches sur les prairies semi-arides de Swift Current, par l'intermédiaire de la 21^e Pépinière internationale de triage des lignées de triticale (ITEN). En plus de posséder une large adaptabilité aux conditions de culture des provinces des Prairies, il offre une nette amélioration du poids spécifique et l'indice de Hagberg est amélioré, ce qui habituellement est signe d'un accroissement de la résistance à la germination sur pied. AC Certa est très résistant aux races dominantes de rouille de la tige (*Puccinia graminis* Pers. f. sp. *tritici* Eriks. et E. Henn) et de rouille des feuilles (*P. recondita* Rob. ex Desm. f. sp. *tritici*). À cela s'ajoute un haut degré de résistance à la carie commune [*Tilletia foetida* (Wallr.) Liro et *T. caries* (DC) Tul.] et un bon degré de résistance à la pourriture sèche (causée surtout par *Bipolaris sorokiniana*).

Mots clés: Description de cultivar, poids spécifique, résistance à la germination prématurée, triticale de printemps (*X Triticosecale* Wittmack)

AC Certa spring triticale (*X Triticosecale* Wittmack) was developed at CIMMYT and introduced by the Semiarid Prairie Agricultural Research Centre, Research Branch, Agriculture and Agri-Food Canada, Swift Current, SK as part of the Triticale Breeding Project, via the 21st ITSN in 1989. Registration no. 4153 was issued for AC Certa on 27 June 1995 by the Plant Health and Plant Products Directorate, Food Production and Inspection Branch, Agriculture and Agri-Food Canada, Ottawa, Ontario, Canada K1A 0C6.

Pedigree and Breeding Methods

AC Certa derives from the cross Hare 263/Civet "S" made by CIMMYT at El Batán, México in 1982. It was developed by a modified pedigree selection method in which the F₁, F₂, F₄, F₆ and F₈ generations were grown in nurseries at Ciudad Obregon, Sonora which were artificially inoculated with stem rust (caused by *Puccinia graminis* Pers. f. sp. *tritici* Eriks.) and leaf rust (caused by *P. recondita* f. sp. *tritici* Rob. ex Desm.). The F₃ and F₅ generations were grown at Toluca, México which is a disease "hot spot" for *Septoria tritici* and *Fusarium* spp. [particularly *F. nivale* (Fr.) Ces. and *F. graminearum* Schwabe], Barley Yellow Dwarf Virus and yellow rust (caused by *Puccinia striiformis* West.). The F₇ generation was grown at El Batán where the prevalent diseases are stem rust, leaf rust, yellow rust and Barley

Yellow Dwarf Virus. Visual "intuitive" selection was done throughout all generations for grain yield components (spike fertility, high number of grains per spike and tillers), agronomic type, pre-harvest sprouting resistance and disease resistance. Following harvest, seed was graded for appearance, size, colour and plumpness and for test weight following bulk harvests. The F₃, F₄ and F₈ generations were bulk harvested and all other early generations were harvested as individual plants. Yield testing was conducted at Toluca in 1987 and Ciudad Obregon in 1987–1988. Seed for entry no. 20 of the 21st ITSN was multiplied at Hermosillo, Sonora during the 1988–1989 growing cycle. It was introduced in 1989 and designated 8930-020. It was evaluated for agronomic and kernel characteristics in 1989 and entered into the Triticale 'A' Test in 1990 and advanced to the Triticale 'B' Test in 1991. It was evaluated in the Western Spring Triticale Cooperative Test from 1992 to 1994 under the experimental designation T128. AC Certa was grown in special nurseries established for the evaluation of reaction to common root rot, common bunt and leaf and stem rust at Agriculture and Agri-Food Canada Research Centres located at Saskatoon, Lethbridge and Winnipeg.

Abbreviations: ITSN, International Triticale Screening Nursery

Table 1. Mean grain yield performance of AC Certa compared with Wapiti, Frank, Banjo, AC Copia and AC Alta triticale and Biggar Canada Prairie Spring wheat, based on data from the Western Spring Triticale tests (1992–1994)

Cultivar	Yield (t ha ⁻¹)				Mean ^y
	Zone 1 ^z	Zone 2	Zone 3	Zone 4	
Biggar	3.79	4.64	6.76	6.77	4.74
Wapiti	4.59	4.80	6.61	6.40	5.09
Frank	4.64	4.74	6.67	6.82	5.16
Banjo	4.41	4.26	6.08	6.74	4.84
AC Copia	4.29	4.78	6.68	6.83	5.01
AC Alta	4.77	5.05	6.67	7.09	5.35
AC Certa	4.84	4.87	7.00	7.05	5.35
LSD _{0.05}	.40	.36	1.16	.74	.26
No. of tests	17	11	3	5	36

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

^yZone 1, Black soils of Manitoba and Saskatchewan; Zone 2, Brown and Dark Brown soils of Saskatchewan and Alberta; Zone 3, Black soils of Alberta; Zone 4, Irrigated Brown soils of Alberta.

Table 3. Disease reactions of AC Certa compared with Wapiti, Frank, Banjo, AC Copia and AC Alta triticale and Biggar Canada Prairie Spring wheat, based on the Western Spring Triticale Cooperative Tests (1992–1994)

Cultivar	Year	Type of Reaction ^z			Common root rot (% infection)
		Leaf rust	Stem rust	Common bunt	
Biggar	1992	40RMR	40RMR	S	2
	1993	5R	10RMR	–	9
	1994	–	20RMR	–	18
Wapiti	1992	10VR	VR	VR	19
	1993	5VR	TR	–	3
	1994	–	VR	–	33
Frank	1992	10VR	VR	VR	56
	1993	5VR	5VR	–	15
	1994	–	VR	–	43
Banjo	1992	10VR	VR	VR	22
	1993	5VR	TR	–	15
	1994	–	VR	–	52
AC Copia	1992	10VR	VR	VR	31
	1993	5VR	TR	–	11
	1994	–	VR	–	42
AC Alta	1992	10VR	VR	VR	37
	1993	5VR	TR	–	16
	1994	–	VR	–	48
AC Certa	1992	10VR	VR	VR	13
	1993	5VR	TR	–	4
	1994	–	VR	–	42

^zTypes of reaction: TR = trace resistant; VR = very resistant; R = resistant; MR = moderately resistant; S = susceptible. Numbers indicate percent infection.

The 117 breeder lines derived from F₇ derived F₁₂ single plant progeny grown at Swift Current, Saskatchewan in 1993 in 3-m rows and in 1994 at Indian Head, Saskatchewan in 15-m rows.

Table 2. Means for agronomic performance of AC Certa compared with Wapiti, Frank, Banjo, AC Copia and AC Alta triticale and Biggar Canada Prairie Spring wheat, based on the Western Spring Triticale Cooperative Tests (1992–1994)

Cultivar	Maturity (d)	Height (cm)	Lodging (1–9) ^z	Test wt. (kg hL ⁻¹)	Kernel wt. (mg)
Biggar	112	81	2.2	76.0	36.0
Wapiti	119	109	2.9	66.8	43.7
Frank	119	105	2.5	68.3	39.3
Banjo	120	116	1.6	66.9	44.8
AC Copia	119	109	2.6	70.6	44.5
AC Alta	120	98	1.6	66.4	48.2
AC Certa	118	110	2.2	73.6	40.9
LSD _{0.05}	1.2	1.5	0.9	0.8	1.2
No. of tests	24	34	9	35	35

^z1 = no lodging; 9 = completely lodged.

Table 4. Grain attributes of AC Certa relative to Wapiti, Frank, Banjo, AC Copia and AC Alta triticale and Biggar Canada Prairie Spring wheat, based on the Western Spring Triticale Cooperative Tests (1992–1994)^z

Cultivar	Grain protein (%)	Flour yield (%)	Mixing development time (min)	Particle size index ^y	Hagberg Falling number (S)
Biggar	10.6	48.4	2.8	62.5	333
Wapiti	9.6	41.9	2.1	64.4	75
Frank	9.9	39.9	2.3	65.8	82
Banjo	9.9	42.0	1.4	63.8	83
AC Copia	9.5	39.2	1.2	63.7	63
AC Alta	9.7	39.5	2.1	64.7	62
AC Certa	10.3	41.6	2.2	67.5	103

^zQuality parameters were determined on two samples from each of two locations in each year; 1992 – Indian Head and Floral; 1993 – Indian Head and Lethbridge; 1994 – Swift Current and Goodale.

^yParticle size index — from Triticale Coop 1993 and 1994 only.

Performance and Adaptation

AC Certa is well adapted to the soils of the Canadian Prairies with overall grain yield equal to the best check, AC Alta (Table 1). In the Black soil zone of Manitoba and Saskatchewan and the Brown soil zone of Saskatchewan and Alberta, AC Certa was significantly greater ($P < 0.05$) yielding than AC Copia and Banjo, respectively. It was not significantly different from the other checks in any of the soil zones.

The test weight of AC Certa was 4% greater than that of AC Copia, the best check cultivar (Table 2). The kernel weight of AC Certa was equal to Frank but significantly ($P < 0.05$) less than the other triticale check cultivars. AC Certa had good lodging resistance and was 1 d earlier maturing than the earliest triticale checks.

Disease Reaction

AC Certa was very resistant to the prevalent races of stem rust (caused by *Puccinia graminis* Pers. f. sp. *tritici* Ericks.), and leaf rust (caused by *P. recondita* f. sp. *tritici* Rob. ex Desm.); highly resistant to common bunt [caused by *Tilletia foetida* (Wallr.) Liro and *T. caries* (DC) Tul.] and moderately

resistant to moderately susceptible to common root rot (caused primarily by *Bipolaris sorokiniana* (Sacc. in Sorok.) Shoem. (Table 3).

End-use Suitability

Hagberg Falling Numbers of AC Certa averaged 20 s greater than those of the best triticale checks making it the first triticale developed to combine high grain yield and high test weight with improved Hagberg Falling Number (Table 4). AC Certa averaged 0.5% greater protein concentration than the check triticale cultivars and 0.3% less than Biggar Canada Prairie Spring Wheat.

Other Characteristics

SPIKES. Long, tapered and nodding at maturity; mid-dense and glaucous; chaff is white; awns are long, white and spreading at maturity.

KERNELS. Red, soft and of medium size; elliptical in shape with rounded cheeks; crease is of medium depth and narrow; brush hairs are of medium length; germ is large and oval in shape; phenol reaction is black.

Maintenance and Distribution of Pedigreed Seed

AC Certa has been released to Progressive Seeds Limited for multiplication, distribution and marketing. Breeder seed will be maintained by the Seed Increase Unit of the Research Farm, Agriculture and Agri-Food Canada, Indian Head, Saskatchewan, Canada S0G 2K0.

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