FRANK SPRING TRITICALE

Frank triticale (× *triticosecale* Wittmack) was developed at the Agriculture Canada Research Station, Swift Current, Saskatchewan. It was produced by intercrossing genotypes developed by the International Center for the Improvement of Maize and Wheat (CIMMYT), the University of Manitoba and the South Saskatchewan Wheat Program prior to subjecting the segregants to early generation yield-testing procedures. Frank demonstrates major improvements in yield, test weight, and earliness relative to other Canadian triticale cultivars.

Key words: Cultivar description, Triticale (spring), × *triticosecale* Wittmack

[Triticale de printemps Frank.]
Titre abrégé: Triticale de printemps Frank.

Le cultivar de triticale Frank (× *triticosecale* Wittmack) a été créé à la Station fédérale de recherches agricoles de Swift Current, en Saskatchewan. Il est issu d'un croisement de génotypes créés par le Centre international d'amélioration du maïs et du blé (CIMMYT), l'Université du Manitoba et le Programme du blé du sud de la Saskatchewan avant de soumettre les ségrégants à des méthodes d'essai de rendement des premières générations. Frank fait preuve de grandes améliorations au chapitre du rendement, du poids spécifique et de la précocité par rapport à d'autres cultivars de tricicale canadiens.

Mots clés: Description de cultivar, triticale (de printemps), × *triticosecale* Wittmack

Frank spring triticale (× *triticosecale* Wittmack) was developed at the Agriculture Canada Research Station, Swift Current, Saskatchewan. Registration No 2982 was issued for Frank in August 1988 by Plant Health and Plant Products Directorate, Food Production and Inspection Branch of Agriculture Canada.

Pedigree and Breeding Methods

Frank was selected from a cross made in 1979 between 7634-246E3, a selection from an F2 introduction from CIMMYT (Beagle 'S'/8*MII-Beagle 'S') and 7631-CJ, a selection from a cross of two selections introduced from the University of Manitoba. Its complete parentage is: Beagle 'S'/8*MII-Beagle 'S'/4/PF-212-CIMMYT/2/Mesela (R.T.119)/Beaver 'S' M.S. (Sel 154)/3/PF-212-CIMMYT/2/Mesela (R.T.119)/Beaver 'S' M.S. (Sel 21).

Frank was developed via modified pedigree and early generation yield-testing procedures. In each of the F_4, F_6 and F_8 generations, selections were evaluated in replicated tests at two locations for grain yield, agronomic characteristics, reaction to leaf and stem rust, and end-use suitability. The F_1, F_3, F_5 and F_7 generations were grown in a winter nursery at Ciudad Obregon, Mexico or Brawley, California. An F_6-derived F_8 line designated 7937-CA3A was evaluated for agronomic performance, reaction to diseases, and end-use suitability in the Triticale 'B' test and subsequently as T59 in the Western Spring Triticale Cooperative test.

In 1986, 144 F_{11} head rows were established in the field. Uniform rows were identified and harvested individually. In 1987, 15.2-m-long rows were grown at the Indian Head Experimental Farm. Uniform lines were bulked to form the breeder seed. A seed sample from each uniform line was retained as a future breeders seed source.

Performance and Adaptation

In 31 station years of data, Frank outyielded Carman by 16% and Wapiti by 3% (Table 1). The grain protein level of Frank was greater than that of Wapiti at the higher yield levels (Table 2). In Zone 2, where Frank was selected, it outyielded Carman by 23% and

Table 1. Means and LSD for yield (kg ha^{-1}) of Frank and check cultivars, Western Spring Triticale Cooperative tests, 1985-1988, inclusive

Cultivar†	Zone 1‡ (10)§	Zone 2 (17)	Zone 3 (6)	Zone 4 (5)	Mean¶
Frank	6810	3380	5200	7780	5210
Wapiti	6510	3200	5340	7560	5050
Carman	5810	2740	5080	6590	4480
HY320	5350	3040	5080	6250	4440
LSD	910	340	920	1025	440

†Frank, Wapiti and Carman are triticales, HY320 is a Red Canada Prairie Spring wheat.
‡Zone 1 = Manitoba, Zone 2 = Saskatchewan, Zone 3 = Alberta dryland, Zone 4 = Alberta Irrigated.
§Number of station-years of data in parentheses.
¶Means within zones are weighted by number of tests, Grand mean is weighted by number of tests within zones.

Table 2. Means for quality parameters of Frank and check cultivars, Western Spring Triticale Cooperative tests (1985-1987)†

Cultivar	Grinding time (s)	Grain protein (%)	Flour yield (%)	Mixing development time (min)	Hagberg falling number (s)
Frank	37	10.4	51.7	3.0	86
Wapiti	37	9.7	53.3	3.0	80
Carman	37	11.0	51.1	1.8	77
HY320	43	11.5	55.7	3.1	277

†Quality was determined on two samples in each year; 1985 — Stewart Valley and Regina; 1986 — Lethbridge and Regina; 1987 — Stewart Valley and Regina.

Wapiti by 6%. Frank has outyielded HY320 CPS wheat by about 17% over all station years (Table 1). On average Frank was 7 cm and 8 cm shorter than Wapiti and Carman, respectively and displayed improved lodging resistance (Table 3). The test weight of Frank represents a 5 kg ha^{-1} and 2 kg ha^{-1} improvement over Carman and Wapiti, respectively (Table 3). Kernel weight of Frank was less than that of Carman and Wapiti (Table 3).

End-use suitability factors estimated by grinding time, protein concentration, flour yield, mixing development time and Hagberg falling number indicated that Frank was higher in protein than Wapiti, but similar for the other characteristics (Table 2).

Description

SPIKE. Tapering, middense, long, semi-nodding, awned; glume midwide long, pubescent, white; glume shoulders apiculate, narrow; glume beak narrow, acuminate.

KERNEL. Color dark red; shape long, mid-wide, ovate; cheeks rounded; brush midsize with midlong hairs; crease wide, middeep; germ large; hardness medium.

STRAW. Strong, medium height averaging 8 cm shorter than Carman; hollow.

MATURITY. About 2 d earlier than Carman and Wapiti.

SHATTERING. Resistant.

DISEASE REACTION. Frank is 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*, to common bunt caused by *Tilletia foetida* (Wallr.) Liro and *Tilletia caries* (DC) Tul., and moderately resistant to common root rot caused primarily by *Bipolaris sorokiniana* (Sacc. in Sorok.) *Shoem*, (Table 4).

END-USE SUITABILITY. Eligible for grades of Canada Triticale.

Table 3. Means for agronomic performance of Frank and check cultivars, Western Spring Triticale Cooperative tests (1985-1987)

Cultivar	Maturity (d) (22)†	Height (cm) (32)	Lodging (1-9)‡ (11)	Test wt. (kg hL^{-1}) (31)	Kernel wt. (mg) (31)
Frank	112	90	2.3	69	40
Wapiti	114	97	2.5	67	44
Carman	114	98	2.4	64	44
HY320	108	71	1.9	77	38

†1-9; 1 = no lodging, 9 = completely lodged.
‡Number of station-years of data in parentheses.

Table 4. Disease reactions of Frank and check cultivars, Western Spring Triticale Cooperative tests (1985-1987)

Cultivar	Year	Type of reaction†			Common root rot (% infection)
		Leaf rust	Stem rust	Bunt	
Frank	1985	TR	VR	VR	49
	1986	TR	1VR	VR	42
	1987	3VR	+VR	VR	31
Wapiti	1985	TR,20MR	VR	VR	28*
	1986	TR	1VR	VR	26**
	1987	5R	1VR	VR	23
Carman	1985	1R	3VR	VR	40
	1986	TR	1VR	VR	40
	1987	3VR	3R	VR	31
HY320	1985	TR,30MR	20VR	44S	38
	1986	3R	10R	96S	42
	1987	20R	20R	48S	41*

†Types of reaction: TR=trace resistant; VR=very resistant; R=resistant; MR=moderately resistant; I=intermediate resistance; S=susceptible. Numbers indicate percent infection.
*,**Denote values that differ from those of Carman at the 5% and 1% level of significance using Duncan's multiple range test within a year.

Maintenance and Distribution of Pedigreed Seed

Frank has been released to SeCan Association, Suite 512, 855 Meadowlands Drive, OTTAWA, Ontario K2C 3N2 for distribution and multiplication. The breeder lines will be maintained by the Seed Section, Agriculture Canada Experimental Farm, Indian Head, Saskatchewan, S0G 2K0.

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