

# Pasqua hard red spring wheat

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Townley-Smith, T. F., Czarnecki, E. M., Campbell, A. B., Dyck, P. L. and Samborski, D. J. 1993. **Pasqua hard red spring wheat**. *Can. J. Plant Sci.* 73: 1095-1098. Pasqua hard red spring wheat (*Triticum aestivum* L.) combines excellent resistance to leaf rust and stem rust with increased sprouting resistance relative to Neepawa or Katepwa. Registered on 6 April 1990, Pasqua is adapted to the entire wheat-growing area of the Canadian prairies. Breeder seed of Pasqua will be maintained by the Agriculture Canada Experimental Farm, Indian Head, SK.

Key words: Cultivar description, spring wheat, *Triticum aestivum* L.

Townley-Smith, T. F., Czarnecki, E. M., Campbell, A. B., Dyck, P. L. et Samborski, D. J. 1993. **Blé roux vitreux de printemps Pasqua**. *Can. J. Plant Sci.* 73: 1095-1098. Le cultivar de blé roux vitreux de printemps (*Triticum aestivum* L.) Pasqua allie une excellente résistance aux rouilles des feuilles et de la tige à une meilleure résistance à la germination prématurée que chez Neepawa ou Katepwa. Homologué en avril 1990, Pasqua convient à toute la zone de culture du blé dans les Prairies canadiennes. La conservation de la semence de l'obteneur sera assurée par la Ferme expérimentale d'Indian Head (ministère de l'Agriculture du Canada) en Saskatchewan.

Mots clés: Description de cultivar, blé de printemps, *Triticum aestivum* L.

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## Origin and Breeding

Pasqua is a new hard red spring wheat (*Triticum aestivum* L.) cultivar developed at the Agriculture Canada Research Station at Winnipeg, MB. The pedigree system was used to select Pasqua from the single backcross, BW63\*2/Columbus. BW63 is a Neepawa backcross derivative with four additional leaf rust resistance genes (*Lr11*, *Lr14b*, *Lr22a*, and *Lr30*). Plants of the final backcross made in 1979 were selected for leaf and stem rust resistance and resistance to preharvest sprouting in F<sub>2</sub>. Lines were selected for stem and leaf rust resistance and grain quality in F<sub>4</sub>, F<sub>6</sub>, and F<sub>8</sub>. The F<sub>3</sub> generation was grown in a greenhouse, while the F<sub>5</sub> and F<sub>7</sub> were grown as head rows in a winter nursery in New Zealand. Pasqua derives from a single F<sub>6</sub> plant. This line was tested as entry No. 41 in the 1984 Central Bread Wheat 'A' test and RL4563 in the Central Bread Wheat 'B' test in 1985. It was tested as BW114 in the Central Bread Wheat Cooperative Test from 1986 to 1988, and in the Western Bread Wheat Cooperative Test in 1987 and 1988. Pasqua

was granted Registration Number 3273 in 1990 by the Seed Division, Plant Health Directorate, Food Production and Inspection Branch, Agriculture Canada. Breeder seed of Pasqua derives from 120 heads selected in F<sub>11</sub> and grown as rows in isolation for two generations.

## Performance and adaptation

Pasqua is a hollow-stemmed wheat that is similar to Neepawa and Katepwa in most agronomic characteristics. In the Central Bread Wheat Cooperative Test the mean yield of Pasqua was 2.2% greater than Neepawa, similar to Katepwa and 2.5% lower than Columbus (Table 1), while in 2 yr in the Western Bread Wheat Cooperative test the yield of Pasqua was similar to Neepawa, 1.3% higher yielding than Katepwa and 2.1% lower yielding than Laura (Table 2). On average Pasqua matured 3.4 d earlier than Columbus. In both tests Pasqua was slightly shorter than Neepawa and Katepwa, and its lodging scores were intermediate between Neepawa and Katepwa. Pasqua had test weight similar to Katepwa. Its kernel weight was slightly higher than Katepwa, but lower than Columbus or Roblin.

Table 1. Grain yield and agronomic characteristics of Pasqua and check cultivars in the Central Bread Wheat Cooperative Tests (1986-1988)

Cultivar	Grain yield (t ha <sup>-1</sup> )			Maturity (d)	Lodging (1-9) <sup>y</sup>	Height (cm)	Test weight (kg hL <sup>-1</sup> )	Kernel weight (mg)
	MB <sup>z</sup>	SK	Overall					
Neepawa	2.83	2.44	2.64	92.6	2.3	79.2	78.9	32.0
Katepwa	2.92	2.47	2.70	92.5	2.5	79.6	79.7	32.7
Columbus	3.04	2.65	2.77	96.2	2.0	84.8	79.7	35.0
Roblin	2.62	2.33	2.43	90.8	1.7	70.2	78.9	34.9
Pasqua	2.91	2.55	2.70	92.8	2.2	77.9	79.7	33.8
SE of mean	0.05	0.06	0.04	0.34	0.18	0.53	0.14	0.21
Station yr	14	13	27	22	11	26	28	28

<sup>z</sup>Manitoba sites were Brandon, Dauphin, Glenlea, Morden, and Portage; Saskatchewan sites were Indian Head, Ituna, Melfort, Regina, Saskatoon, and Yorkton.

<sup>y</sup>1 = no lodging, 9 = severely lodged.

Table 2. Grain yield and agronomic characteristics of Pasqua and check cultivars in the Western Bread Wheat Cooperative Tests (1987-1988)

	Grain yield (t ha <sup>-1</sup> )				Height (cm)	Maturity (d)	Lodging (1-9) <sup>y</sup>	Test weight (kg hL <sup>-1</sup> )	Kernel weight (mg)
	Soil zone <sup>z</sup>								
	Brown	Dark Brown	Black	Overall					
Neepawa	2.09	2.44	3.46	2.37	71.2	98.7	3.2	78.9	31.2
Katepwa	2.13	2.47	3.21	2.33	70.2	97.8	3.7	79.0	31.4
Laura	2.12	2.67	3.00	2.41	68.9	100.3	3.9	80.2	32.2
Pasqua	2.17	2.48	3.28	2.36	69.0	98.9	3.5	79.3	32.7
SE of mean	0.06	0.05	0.12	0.04	0.61	0.24	0.34	0.15	0.31
Station yr	3	13	2	18	18	16	5	16	6

<sup>z</sup>Brown soil zone sites were Kindersley, Stewart Valley and Swift Current; Dark Brown soil zone sites were Acme, Irricana, Lethbridge, Regina, Saskatoon, Scott and Watrous; Black soil zone site was Ellerslie.

<sup>y</sup>1 = no lodging, 9 = severely lodged.

Pasqua is highly resistant to races of leaf and stem rust prevalent in western Canada. Pasqua has leaf rust resistance genes *Lr11*, *Lr13*, *Lr14b*, *Lr30* and *Lr34* (Dyck 1993). It is similar to Neepawa in its reaction to common bunt and common root rot; however, it is less resistant to loose smut than Neepawa or Katepwa (Table 3).

In tests at Winnipeg where two replicates of the Central Bread Wheat Cooperative test were allowed to weather in the field for 2 mo after harvest ripeness, Pasqua had a falling number value intermediate between those of Katepwa and Columbus, indicating an improved level of preharvest sprouting resistance over Katepwa (Table 4). Similarly, in an artificial weathering test in 1988, its sprouting score was intermediate between that of Columbus and Katepwa.

Pasqua is well adapted to the entire wheat-growing area of the prairie provinces of Canada. It has very good leaf and stem rust resistance combined with an improved level of sprouting resistance over Neepawa and Katepwa, while being earlier maturing than Columbus.

### Description

**SPIKE.** Erect, strap-shaped, apically awnleted, mid-lax to mid-dense; glumes glabrous and white, mid-long, mid-wide with square medium width shoulder and obtuse beak.

**KERNEL.** Colour medium red; shape mid-size, mid-long, mid-wide, ovate to elliptical; germ mid-size, ovate; crease mid-wide, mid-deep; cheeks rounded to angular; brush mid-size, mid-long.

Table 3. Disease reactions of Pasqua wheat and check cultivars in the Central Bread Wheat Cooperative Tests (1986-1988)

Cultivar	Year	Stem rust	Leaf rust	Common root rot	Loose smut	Common bunt
Neepawa	1986	10 R <sup>z</sup>	30 M	33 <sup>y</sup>	10 R	18 S
	1987	10 R-MR	40 MS	19	3 R	13 MR
	1988	10 R	20 MR-MS	29	11 MR	16 MR
Katepwa	1986	5 R	10 M	31	7 R	3 R
	1987	3 VR	30 MR-MS	21	6 R	13 MR
	1988	5 R	30 MR-MS	36	21 MR	1 R
Columbus	1986	20 R-MR	T R	43**	34 MS	8 I
	1987	20 R-MR	5 R	31**	43 MS	1 R
	1988	10 R-MR	10 R	39*	20 MS	2 R
Roblin	1986	5 VR	1 R	30	23 MR	49 S
	1987	5 VR	10 M	16	9 R	55 S
	1988	3 VR	3 VR	25	11 MR	21 S
Pasqua	1986	5 VR	T R	36	10 R	17 S
	1987	5 VR	3 VR	30**	—	17 MR
	1988	3 VR	3 VR	32	31 MS	2 R

<sup>z</sup>Percent infection and reaction type. Type of reactions: TR = trace resistant; VR = very resistant; R = resistant; MR = moderately resistant; I = intermediate resistance; M = intermediate to MR and MS; MS = moderately susceptible; S = susceptible.

<sup>y</sup>Disease index.

\*Different from Neepawa ( $P < 0.05$ ).

\*\*Different from Neepawa ( $P < 0.01$ ).

Table 4. Falling number or sprout score after field weathering or artificial weathering (1986-1988)

Cultivar	Falling number field weathered 2 mo after maturity (s)			Sprout score (1-7) <sup>y</sup> 1988	Falling number <sup>z</sup> (artificially sprouted 55 h) 1986
	1987	1988	Mean		
Neepawa	284	143	214	5.00	56
Katepwa	240	157	199	5.15	52
Columbus	403	307	355	3.15	235
Roblin	184	90	137	ND <sup>x</sup>	56
Pasqua	345	241	293	3.85	130
SE of mean	25.4	11.0	13.8	0.55	13.4

<sup>z</sup>Minimum value is 50 with this machine.

<sup>y</sup>1 = no sprouting, 7 = more than five visibly sprouted kernels on all heads.

<sup>x</sup>Not determined.

**STRAW.** Little or no anthocyanin coloration, medium thickness; hollow inter-nodes; slight waxy bloom, slightly shorter than Katepwa.

**SAWFLY REACTION.** Susceptible.

**MATURITY.** Slightly later than Katepwa.

**DISEASE REACTION.** Highly resistant to leaf and stem rust (caused by *Puccinia recondita* Rob. ex. Desm. f. sp. *tritici* and *P. graminis* Pers. f. sp. *tritici* Eriks. and E. Henn.,

respectively); moderately resistant to bunt (caused by *Tilletia foetida* (Wallr.) Liro and *T. caries* (DC.) Tul.); moderately susceptible to loose smut (caused by *Ustilago tritici* (Pers) Rostr.); and moderately resistant to root rot (caused by *Cochiobolus sativus* Ito and Kurib.).

**QUALITY.** Equal to Neepawa; good overall quality with moderate preharvest sprouting resistance.

**Seed Distribution**

Pasqua has been released to SeCan Association, 200-57 Auriga Drive, Nepean, Ontario, Canada K2E 8B2 for distribution. Breeder seed will be maintained by the Seed Section, Agriculture Canada Experimental Farm, Indian Head, Saskatchewan, Canada S0G 2K0.

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**Dyck, P. L. 1993.** The inheritance of leaf rust resistance in the wheat cultivar Pasqua. *Can. J. Plant Sci.* 73: 903-906.

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