CULTIVAR DESCRIPTION

Red River 1997 Roundup Ready™ high erucic acid, low glucosinolate summer rape

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McVetty, P. B. E., Fernando, W. G. D., Li, G., Tahir, M. and Zelmer, C. D. 2010. **Red River 1997 Roundup Ready™ high erucic acid, low glucosinolate summer rape**. Can. J. Plant Sci. **90**: 711–713. Red River 1997 summer rape (*Brassica napus* L.) is the world's third Roundup Ready™ high erucic acid, low glucosinolate cultivar. On average, Red River 1997 yielded 13% more seed and 22 g kg^{-1} more seed oil, but 4 g kg^{-1} less meal protein than MillenniUM 03 high erucic acid, low glucosinolate summer rape. Red River 1997 has an erucic acid content of 51.4% in isolated field trials of HEAR lines and is adapted to the southern *B. napus* growing regions of western Canada.

Key words: Rape, Roundup Ready™ high erucic acid, low glucosinolate, cultivar description

McVetty, P. B. E., Fernando, W. G. D., Li, G., Tahir, M. et Zelmer, C. D. 2010. **Le colza à faible teneur en glucosinolates et à haute teneur en acide érucique Roundup Ready^MC Red River 1997**. Can. J. Plant Sci. **90**: 711–713. Red River 1997 est la troisième variété de colza (*Brassica napus* L.) à haute teneur en acide érucique Roundup Ready^MC et à faible teneure en glucosinolates au monde. En moyenne, Red River 1997 donne 13 % plus de graines que la variété à forte teneur en acide érucique et à faible teneur en glucosinolates MilleniUM 03, et ses graines renferment 22 g par kg de plus d'huile mais 4 g par kg de moins de tourteau que cette variété. Lors des essais isolés sur le terrain des lignées à forte teneur en acide érucique, Red River 1997 a révélé une teneur en acide érucique de 51,4 %. Le cultivar est adapté aux zones de culture australes de *B. napus* dans l'ouest du Canada.

Mots clés: Colza, forte teneur en acide érucique Roundup Ready^MC, faible teneur en glucosinolates, description de cultivar

Red River 1997 Roundup Ready™ summer rape (*Brassica napus* L.), tested as RRHR6818 in the Western Canadian Co-operative Canola/Rapeseed HEAR Contract Registration Tests in 2007 and 2008, is a high erucic acid (51.4%), rapeseed (HEAR) cultivar with low glucosinolate meal (12.1 μmol total glucosinolates g^{-1} seed @ 8.5% H_2O). On average, Red River 1997 yielded 13% more seed and 22 g kg^{-1} more seed oil but 4 g kg^{-1} less meal protein than MillenniUM 03 high erucic acid, low glucosinolate summer rape, the Western Canadian Canola/Rapeseed Recommending Committee Inc. (WCC/RRC Inc.) designated HEAR check. Red River 1997 was developed at the Department of Plant Science, University of Manitoba, and it was issued a Certificate of Restricted Registration no. 6733 on 2010 Feb. 05, by the Variety Registration Office, Plant Products Division Canadian Food Inspection Agency Ottawa, Ontario. The terms of the Restricted Registration state that the Registrant of Red River 1997 (i.e., Bunge Canada) shall implement and maintain a quality control system as reviewed and approved by the Registrar. Red River 1997 is the third in the series of Roundup Ready HEAR cultivars, after Red River 1826 (McVetty et al. 2006) and Red River 1852 (McVetty et al. 2006). The numeric designation 1997 refers to the year 1997, the year of the third largest Red River flood in recorded history.

Pedigree and Breeding Methods

Red River 1997 (RRHR6818) was derived from a cross between the homozygous Roundup Ready gene containing canola quality summer rape (*B. napus*) cultivar "SP Bucky RR" and the high erucic acid rapeseed (*B. napus*) line HR 102, made in 2003. HR 102 was developed from the cross Cyclone/Mercury//LG 3333, made in 1998. Twelve F_1 plants from the HR 102/SP Bucky cross were grown in the greenhouse, sprayed with Roundup and self-pollinated to produce an F_2 population. Three hundred and thirty-six F_2 plants were grown in the greenhouse and sprayed with Roundup. The surviving 282 F_2 plants were self-pollinated to the F_3. The seed of F_3 families were analyzed for erucic acid content. Fifty-five F_3 families with high erucic acid content (>40%) were selected for advancement. Twenty-four plants each from 55 F_3 families were grown in the greenhouse and sprayed with Roundup. Twenty-three pure breeding Roundup Ready F_3 families were identified and eight plants in each of these F_3 families self-pollinated to the F_4. The F_4 seed families produced on each plant from the pure breeding Roundup Ready F_3 families were analyzed for erucic acid content. Nine pure breeding

high erucic acid content (>40%) F_3 families were identified. Seventy-two pure breeding Roundup Ready, high erucic acid content F_4 families were grown in isolated fields of HEAR materials in 2005. Selection in the F_4 families was based solely on seed quality, i.e., on the basis of high erucic acid content, high seed oil content and high meal protein content. Ten F_5 families were grown in advanced yield trials in 2006. Two bulk F_4-derived families were grown in the HEAR Contract Registration Tests in 2007 and 2008. Red River 1997 (RRHR6818) was derived from a single F_4 family, bulk harvested in 2005.

Performance

Red River 1997 was evaluated in 2007 and 2008 in the mid- and long-season zones of the WCC/RRC Inc. HEAR Contract Registration Tests. It surpassed MillenniUM 03 in yield in each production zone, and had an average yield advantage of 13% (Table 1). Red River 1997 matured in 95 d, 3 d later than MillenniUM 03, and 1 d later than the mean of the WCC/RRC Inc. designated canola quality checks for maturity, 46A65 and Q2 (data not shown). It had a lower lodging score (2.1) compared with MillenniUM 03 (2.6). Red River 1997 had an average seed oil content of 498 g kg^{-1}, 22 g kg^{-1} higher than MillenniUM 03 and an average meal protein content of 462 g kg^{-1}, 4 g kg^{-1} lower than MillenniUM 03. The erucic acid content of Red River 1997 seed averaged 51.4% of the total fatty acids in the seed oil, 2.2% lower than the erucic acid content of MillenniUM 03 seed produced in 10 isolated field trials of HEAR lines.

The average total glucosinolate content of the whole seed on a 8.5% moisture basis, over the two years of official trials was 12.1 μmol g^{-1} seed for Red River 1997, higher than that for MillenniUM 03 (10.6 μmol g^{-1} seed) but lower than the mean of canola checks (17.5 μmol g^{-1} seed) (data not shown). This permits the meal produced by Red River 1997 to be used in similar applications to canola meal.

Other Characteristics

Red River 1997 was evaluated in the disease tests conducted in 2007 and 2008 by the WCC/RRC Inc. Based on the results from these tests, Red River 1997 is classified as resistant to blackleg disease (caused by *Leptosphaeria maculans*) and fusarium wilt (caused by *Fusarium oxysporum*) (Table 1). It is the third Roundup Ready™ blackleg and fusarium wilt resistant high erucic acid rapeseed cultivar to be registered in Canada.

Maintenance and Distribution of Pedigreed Seed

Breeder seed is maintained by Viterra, 210-407 Downey Road, Saskatoon, Saskatchewan, Canada S7N 4L8 under contract to Bunge Canada. Viterra will also multiply and distribute other classes of pedigreed seed

Table 1. Yield, maturity, lodging, seed oil content, meal protein content, erucic acid content and total glucosinolate content of summer rape (*Brassica napus* L.) cultivars Red River 1997 (RRHR6818) and MillenniUM 03 in the Western Canadian Co-operativeCanola/Rapeseed HEAR Contract Registration Tests 2007–2008

Cultivar	Yield (kg ha^{-1})			Maturity (1–5)	Lodging[x] (g kg^{-1})	Seed oil[w] (g kg^{-1})	Meal protein[v] (g kg^{-1})	Erucic acid[u] (%)	Total glucosinolates[t] (μmol g^{-1} seed)	Blackleg disease severity[s] (0–5)	Fusarium wilt class[r]
	Long-season zone[z]	Mid-season zone[y]	Mean (d)								
Red River 1997 (RRHR6818)	2674	4143	3531	95	2.1	498	462	51.4	12.1	1.1	R
MillenniUM 03	2515	3535	3110	92	2.6	476	466	53.6	10.6	1.2	R
LSD (0.05)[q]	125	158	106	0.5	0.1	3.4	3.9	0.6	0.6	–	–
Tests (2007+2008)	5	7	12	12	9	10	10	10	10	4	2

[z]Tests grown at Brandon and Carman MB, (2007 and 2008), and Portage la Prairie, MB (2008).
[y]Tests grown at Lake Lenore, SK (2007 and 2008), Rosthern, SK (2008), Valparaiso (2008), Watrous, SK (2008), and Yorkton, SK (2007 and 2008).
[x]1 = erect, 5 = prostrate.
[w]Oil content (whole-seed zero-moisture basis), by near infrared measurements.
[v]Protein content (N × 6.25 in oil-free meal, zero-moisture basis), by near infrared measurements.
[u]Erucic acid (% of total fatty acids in seed oil), by gas chromatography, from seed grown in isolated fields of HEAR materials.
[t]Total glucosinolates (whole seed, 8.5% moisture basis), by near infrared measurements.
[s]Mean of four field tests grown in 2007–2008, Westar mean 3.7 in these trials.
[r]Mean of two trials grown in 2007–2008.
[q]LSD derived from cultivar-by-test interaction mean square.

under contract to Bunge Canada, Bag #1, Highway 35 south, Nipawin Saskatchewan, Canada S0E 1E0.

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