

Request for Support for Registration of TR06294

Crop: Barley (*Hordeum vulgare* L.)
Type: Two-row malting

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Test #'s: TR06294, BM9831D-290
Pedigree: TR251/Newdale//TR253/Newdale
Area of Adaptation: Western Canada

Description:

TR06294 is a doubled haploid two-row hulled malting barley line widely adapted to western Canada that was 9% higher yielding than AC Metcalfe over 2 years of testing across all soil zones. It combines good agronomic performance with an excellent disease resistance package, including resistance to loose and surface borne smuts, moderate resistance to spot blotch, spotted net blotch and fusarium head blight (FHB), and moderately resistant to moderately susceptible reactions to common root rot and stem rust. TR06294 has a desirable malting quality profile with consistently higher malt extract and lower soluble protein content than AC Metcalfe. It has lower diastatic power and alpha amylase activity than AC Metcalfe but is at least equal to CDC Copeland. TR06294 has higher beta glucan content than AC Metcalfe and CDC Copeland but is lower than Harrington. It has higher friability than AC Metcalfe, and is generally similar in other traits including resistance to hull peeling. Overall, TR06294's desirable combination of agronomic traits, disease resistance and malting quality, particularly high grain yield and malt extract, should make it a useful two-row malting barley for western Canadian producers and the malting and brewing industry.

From 2007 to 2009, TR06294 (BM9831D-290) was evaluated in the Maritime Two-row Barley Registration - Recommendation Test and in the Quebec Two-row Barley Registration - Recommendation Test where it performed well for a malting barley, yielding similar to the mean of the hulled feed check varieties in both tests. It was 1 to 3 days later maturing, generally shorter in plant height, and had lower kernel and test weights than the checks. In 2009, TR06294 was evaluated in the Manitoba Crop Variety Evaluation Trial (MCVET) where it was 24% higher yielding than AC Metcalfe over 5 sites. It was also about 18% higher yielding than AC Metcalfe over 11 sites in the 2009 Saskatchewan regional variety test conducted by the Saskatchewan Variety Performance Group."

Strengths:

- 9% higher yielding than AC Metcalfe.
- Shorter straw than AC Metcalfe.
- Heavier kernels than AC Metcalfe.
- Resistance to loose and surface borne smuts.
- Moderate resistance to spot blotch and spotted net blotch.
- Higher malt extract and lower soluble protein content than AC Metcalfe.

Neutral characteristics:

- Straw strength similar to AC Metcalfe.
- One day later to head and mature than AC Metcalfe.
- Lower kernel plumpness and test weight than AC Metcalfe.
- FHB resistance and DON accumulation similar to AC Metcalfe.
- Moderately resistant to moderately susceptible reactions to common root rot and stem rust.
- Alpha amylase and diastatic power lower than AC Metcalfe.
- Beta glucan content higher than AC Metcalfe and CDC Copeland.
- Hull peeling resistance similar to AC Metcalfe.

Weaknesses:

- Susceptible to scald and Septoria as are the checks.
- Moderately susceptible to netted net blotch.

Table 1. Grain yield (kg/ha) for TR06294 and checks from the 2006 and 2007 Western Cooperative Two-row Barley Registration Test

Entry	Black Soil Zone		Black-Grey Soil Zone		Brown Soil Zone		Combined	
	Yield (kg/ha)	Yield as % Metcalfe	Yield (kg/ha)	Yield as % Metcalfe	Yield (kg/ha)	Yield as % Metcalfe	Yield (kg/ha)	Yield as % Metcalfe
2006								
Harrington	5516	93	4286	96	5188	96	5065	95
Xena	6784	114	5345	120	6423	119	6266	117
AC Metcalfe	5942	100	4458	100	5400	100	5334	100
CDC Kendall	5735	97	4435	99	5460	101	5290	99
TR06294	6666	112	4883	110	5967	110	5914	111
#SY	5		4		7		16	
2007								
CDC Copeland	5508	106	5109	106	4780	92	5084	100
Xena	5549	107	5656	118	5659	109	5629	111
AC Metcalfe	5187	100	4807	100	5214	100	5071	100
TR06294	5873	113	4981	104	5393	103	5384	106
#SY	4		5		6		15	
Combined								
Xena	6235	111	5518	119	6071	114	5958	114
AC Metcalfe	5607	100	4652	100	5314	100	5207	100
TR06294	6313	113	4938	106	5702	107	5658	109
#SY	9		9		13		31	

Table 2. Agronomic characteristics for TR06294 and checks from the 2006 and 2007 Western Cooperative Two-row Barley Registration Test

Entry	Days to Head	Days to Maturity	Plant Height (cm)	Lodging Score (1-9)	Test Weight (kg/hl)	Kernel Weight (g/1000k)	Plump (%>6/64")
2006							
Harrington	58.0	86.1	81.0	6.0	64.5	42.6	88.0
Xena	57.8	87.5	83.6	4.8	67.0	49.8	93.4
AC Metcalfe	58.4	86.9	83.1	5.7	66.2	44.7	89.9
CDC Kendall	59.2	86.0	80.8	6.8	65.4	43.4	92.7
TR06294	59.5	87.1	77.7	5.3	64.4	46.0	87.1
#SY	13	13	14	2	13	13	10
2007							
CDC Copeland	59.0	90.0	87.0	4.5	63.3	43.8	88.0
Xena	56.6	90.3	85.6	3.8	66.2	47.2	89.0
AC Metcalfe	56.6	89.2	85.9	4.2	65.2	42.7	87.8
TR06294	58.3	90.6	79.9	4.7	64.0	44.9	87.8
#SY	11	13	14	2	13	12	11
Combined							
Xena	57.2	88.9	84.6	4.3	66.6	48.6	91.1
AC Metcalfe	57.6	88.0	84.5	4.9	65.7	43.7	88.8
TR06294	58.9	88.9	78.8	5.0	64.2	45.5	87.4
#SY	24	26	28	4	26	25	21

Table 3. Disease reactions for TR06294 and checks from the 2006 and 2007 Western Cooperative Two-row Barley Registration Test

Entry	Net Blotch				Spot Blotch				Stem Rust, Winnipeg	
	Winnipeg			Melf	Bran	Melf	Sask-	Winnipeg	MCC	MCC
	102	858	857	-ort	-don	-ort	atoon	1903	IT	IT
2006									(06/21/06)	(02/07/07)
Harrington	10	10	9	7.5	7.5	4.5	6.5	7	3-2	3-2
Xena	10	10	3	2.0	7.0	5.0	5.0	6	0	0;1
AC Metcalfe	9	10	5	4.5	5.5	3.5	4.5	6	0	0;1
CDC Kendall	5	9	3	1.5	6.5	4.0	4.8	6	12?	3-2
TR06294	2	9	2	1.5	1.5	3.0	1.0	2	0	0;
2007										QCC
CDC Copeland	6	9	5	2.0	4.5	5.0	5.5	6	0;	23-
Xena	9	10	5	1.0	5.0	4.5	4.5	7	0;	12.0
AC Metcalfe	9	9	5	3.5	5.0	3.5	3.5	6	0;	12+
TR06294	6	9	2	1.0	2.5	1.8	2.0	3	0;	22+

Table 3. Disease reactions (continued)

Entry	Winnipeg Septoria 1998	Scald			Smuts			
		Winnipeg 1493	Edmon -ton	Laco -mbe	Sask. Covered	Winnipeg		
						U. nuda	U. hordei	U. nigra
2006			Aug. 9	Aug. 1				
Harrington	S	S	1.5	6.5	S	29.0	10.0	22.5
Xena	S	S	2.5	7.0	S	81.0	3.0	40.0
AC Metcalfe	S	S	0.5	6.0	R	0.0	3.0	7.5
CDC Kendall	S	S	2.0	4.0	MR	81.0	3.5	26.5
TR06294	S	S	1.5	6.0	R	0.0	0.5	6.0
2007			Aug. 9	July31				
CDC Copeland	-	S	3.0	9.0	MR	94.0	0.5a	0a
Xena	-	S	2.0	8.5	S	89.0	0b	0b
AC Metcalfe	-	S	2.0	8.5	R	0.0	0a	0a
TR06294	-	S	3.0	8.5	MR	0.0	0b	0b

Table 3. Disease reactions (continued)

Entry	Lacombe		FHB - Brandon	
	CRR		Rating	DON
	%	Rating	(1-5)	ppm
2006				
Harrington	89	-	2.3	5.9
Xena	89	-	1.3	3.7
AC Metcalfe	89	-	2.3	5.6
CDC Kendall	87	-	2.5	5.4
TR06294	88	-	2.2	5.6
2007				
CDC Copeland	96	S	1.8	1.9
Xena	57	MRMS	2.2	1.7
AC Metcalfe	80	MS	2.2	5.9
TR06294	68	MRMS	3.5	1.3

Table 4. Malting quality characteristics for TR06294 and checks from the 2006 and 2007 Western Cooperative Two-row Barley Registration Test

Entry	Plump (%>6/64")	Kernel Weight (g/1000k)	Grain Protein %	G.E. 4ml %	G.E. 8ml %	Steepout Moist. %	Fine Extract %	Soluble Protein %	Ratio S/T %
2006									
Harrington	88.7	43.0	11.5	100	99		80.0	4.87	43.1
AC Metcalfe	91.7	44.8	11.7	99	94		80.4	4.85	41.9
CDC Kendall	92.9	42.4	11.8	99	96		80.0	4.93	41.9
TR06294	86.5	45.1	11.5	100	96		81.3	4.62	40.9
#SY	3	3	3	3	3		3	3	3
2007									
CDC Copeland	94.1	43.1	10.2	97	96	46.6	81.1	4.62	45.6
AC Metcalfe	92.8	42.3	10.7	98	96	46.9	81.7	4.78	46.7
TR06294	92.3	44.1	10.9	96	96	46.5	82.0	4.50	42.0
#SY	3	3	3	3	3	3	3	3	3
Combined									
AC Metcalfe	92.2	43.6	11.2	99	95	46.9	81.1	4.81	44.3
TR06294	89.4	44.6	11.2	98	96	46.5	81.7	4.56	41.5
#SY	6	6	6	6	6	3	6	6	6

Table 4. (continued)

Entry	Diastatic Power °L	Alpha Amylase D.U.	Beta Glucan ppm	Viscosity cps	Friability %	Malt Peeled %
2006						
Harrington	107	58.3	111	1.44	94.1	10.0
AC Metcalfe	126	61.9	64	1.42	90.5	6.7
CDC Kendall	145	61.0	51	1.41	94.7	5.1
TR06294	97	57.8	70	1.42	97.4	5.4
#SY	3	3	3	3	2	2
2007						
CDC Copeland	105	52.0	80	1.43	98.4	5.7
AC Metcalfe	123	68.0	87	1.42	99.4	4.8
TR06294	110	62.6	123	1.42	97.7	5.2
#SY	3	3	3	3	2	2
Combined						
AC Metcalfe	125	64.9	76	1.42	94.9	5.8
TR06294	103	60.2	97	1.42	97.5	5.3
#SY	6	6	6	6	4	4

