

## APPENDIX A

## VARIETY DESCRIPTION – TR06294 (Two-Row Malting Barley)

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

**Proposers:** W.G. Legge  
 Agriculture and Agri-Food Canada  
 Brandon Research Centre  
 P.O. Box 1000A, R.R. #3  
 Brandon, MB R7A 5Y3

**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**

Entry	Black Soil Zone		Black-Grey Soil Zone		Brown Soil Zone		Combined	
	Yield (kg/ha)	% Metcalfe	Yield (kg/ha)	% Metcalfe	Yield (kg/ha)	% Metcalfe	Yield (kg/ha)	% Metcalfe
<b><u>2006</u></b>								
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
<b>TR06294</b>	<b>6666</b>	<b>112</b>	<b>4883</b>	<b>110</b>	<b>5967</b>	<b>110</b>	<b>5914</b>	<b>111</b>
#SY	5		4		7		16	
<b><u>2007</u></b>								
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
<b>TR06294</b>	<b>5873</b>	<b>113</b>	<b>4981</b>	<b>104</b>	<b>5393</b>	<b>103</b>	<b>5384</b>	<b>106</b>
#SY	4		5		6		15	
<b><u>Combined</u></b>								
Xena	6235	111	5518	119	6071	114	5958	114
AC Metcalfe	5607	100	4652	100	5314	100	5207	100
<b>TR06294</b>	<b>6313</b>	<b>113</b>	<b>4938</b>	<b>106</b>	<b>5702</b>	<b>107</b>	<b>5658</b>	<b>109</b>
#SY	9		9		13		31	

**Barley Registration Test**

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")
<b><u>2006</u></b>							
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
<b>TR06294</b>	<b>59.5</b>	<b>87.1</b>	<b>77.7</b>	<b>5.3</b>	<b>64.4</b>	<b>46.0</b>	<b>87.1</b>
#SY	13	13	14	2	13	13	10
<b><u>2007</u></b>							
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
<b>TR06294</b>	<b>58.3</b>	<b>90.6</b>	<b>79.9</b>	<b>4.7</b>	<b>64.0</b>	<b>44.9</b>	<b>87.8</b>
#SY	11	13	14	2	13	12	11
<b><u>Combined</u></b>							
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
<b>TR06294</b>	<b>58.9</b>	<b>88.9</b>	<b>78.8</b>	<b>5.0</b>	<b>64.2</b>	<b>45.5</b>	<b>87.4</b>
#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	-ort	Bran	Melf	Sask-	Winnipeg	MCC	MCC
	102	858	857	-ort	-don	-ort	atoon	1903	IT	IT
<b><u>2006</u></b>										
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
<b>TR06294</b>	<b>2</b>	<b>9</b>	<b>2</b>	<b>1.5</b>	<b>1.5</b>	<b>3.0</b>	<b>1.0</b>	<b>2</b>	<b>0</b>	<b>0;</b>
<b><u>2007</u></b>										
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+
<b>TR06294</b>	<b>6</b>	<b>9</b>	<b>2</b>	<b>1.0</b>	<b>2.5</b>	<b>1.8</b>	<b>2.0</b>	<b>3</b>	<b>0;</b>	<b>22+</b>
<b><u>QCC</u></b>										

Table 3. Disease reactions (continued)

Entry	Winnipeg Septoria	Scald			Smuts			
		Winnipeg	Edmon	Laco	Sask.	Winnipeg		
	1998	1493	-ton	-mbe	Covered	U. nuda	U. hordei	U. nigra
<b>2006</b>			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
<b>TR06294</b>	S	S	1.5	6.0	R	0.0	0.5	6.0
<b>2007</b>			Aug. 9	July 31				
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
<b>TR06294</b>	-	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
<b>2006</b>				
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
<b>TR06294</b>	<b>88</b>	<b>-</b>	<b>2.2</b>	<b>5.6</b>
<b>2007</b>				
CDC Copeland	96	S	1.8	1.9
Xena	57	MRMS	2.2	1.7
AC Metcalfe	80	MS	2.2	5.9
<b>TR06294</b>	<b>68</b>	<b>MRMS</b>	<b>3.5</b>	<b>1.3</b>

**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 %
<b><u>2006</u></b>									
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
<b>TR06294</b>	<b>86.5</b>	<b>45.1</b>	<b>11.5</b>	<b>100</b>	<b>96</b>		<b>81.3</b>	<b>4.62</b>	<b>40.9</b>
#SY	3	3	3	3	3		3	3	3
<b><u>2007</u></b>									
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
<b>TR06294</b>	<b>92.3</b>	<b>44.1</b>	<b>10.9</b>	<b>96</b>	<b>96</b>	<b>46.5</b>	<b>82.0</b>	<b>4.50</b>	<b>42.0</b>
#SY	3	3	3	3	3	3	3	3	3
<b><u>Combined</u></b>									
AC Metcalfe	92.2	43.6	11.2	99	95	46.9	81.1	4.81	44.3
<b>TR06294</b>	<b>89.4</b>	<b>44.6</b>	<b>11.2</b>	<b>98</b>	<b>96</b>	<b>46.5</b>	<b>81.7</b>	<b>4.56</b>	<b>41.5</b>
#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 %
<b><u>2006</u></b>						
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
<b>TR06294</b>	<b>97</b>	<b>57.8</b>	<b>70</b>	<b>1.42</b>	<b>97.4</b>	<b>5.4</b>
#SY	3	3	3	3	2	2
<b><u>2007</u></b>						
CDC Copeland	105	52.0	80	1.43	98.4	5.7
AC Metcalfe	123	68.0	87	1.42	99.4	4.8
<b>TR06294</b>	<b>110</b>	<b>62.6</b>	<b>123</b>	<b>1.42</b>	<b>97.7</b>	<b>5.2</b>
#SY	3	3	3	3	2	2
<b><u>Combined</u></b>						
AC Metcalfe	125	64.9	76	1.42	94.9	5.8
<b>TR06294</b>	<b>103</b>	<b>60.2</b>	<b>97</b>	<b>1.42</b>	<b>97.5</b>	<b>5.3</b>
#SY	6	6	6	6	4	4

**Table 5. Malting quality characteristics for TR06294 and checks from the 2007 and 2008 Collaborative Trials**

Entry	Plump (%>6/64")	Kernel Weight (g/1000k)	Grain Protein %	Barley P & B %	G.E. 4ml %	G.E. 8ml %	Steepout Moist. %	Malt P & B %
<b><u>2007</u></b>								
AC Metcalfe	93.2	43.4	12.6	1.0	94	89	46.2	6.2
CDC Copeland	94.7	43.8	11.5	1.2	97	94	46.1	3.9
<b>TR06294</b>	<b>92.1</b>	<b>43.6</b>	<b>11.6</b>	<b>1.3</b>	<b>95</b>	<b>90</b>	<b>46.5</b>	<b>12.9</b>
#SY	4	4	4	4	4	4	4	3
<b><u>2008</u></b>								
AC Metcalfe	97.7	50.2	11.4	3.0	97	88	44.5	4.1
CDC Copeland	98.2	50.6	10.9	2.7	97	91	44.1	3.2
<b>TR06294</b>	<b>97.2</b>	<b>51.8</b>	<b>11.2</b>	<b>2.5</b>	<b>96</b>	<b>86</b>	<b>44.3</b>	<b>3.4</b>
#SY	5	4	5	5	4	4	5	5
<b><u>Combined</u></b>								
AC Metcalfe	95.7	46.8	11.9	2.1	95	88	45.2	4.9
CDC Copeland	96.6	47.2	11.1	2.0	97	92	45.0	3.4
<b>TR06294</b>	<b>94.9</b>	<b>47.7</b>	<b>11.3</b>	<b>2.0</b>	<b>95</b>	<b>88</b>	<b>45.3</b>	<b>6.9</b>
#SY	9	8	9	9	8	8	9	8

**Table 5. (continued)**

Entry	Fine Extract %	Malt Protein %	Soluble Protein %	Ratio S/T %	Diastatic Power °L	Alpha Amylase D.U.	Beta Glucan ppm	Visco- osity cps	Friab ility %
<b><u>2007</u></b>									
AC Metcalfe	80.4	12.1	5.21	43.3	148	71.7	179	1.46	78.1
CDC Copeland	81.0	11.3	5.17	45.7	130	62.6	152	1.46	84.8
<b>TR06294</b>	<b>82.5</b>	<b>11.1</b>	<b>5.08</b>	<b>46.6</b>	<b>127</b>	<b>72.6</b>	<b>211</b>	<b>1.46</b>	<b>82.4</b>
#SY	4	4	4	4	4	4	4	4	3
<b><u>2008</u></b>									
AC Metcalfe	81.3	11.4	4.69	41.6	157	66.9	265	1.58	69.6
CDC Copeland	81.5	11.0	4.67	42.7	129	57.5	207	1.56	82.0
<b>TR06294</b>	<b>81.9</b>	<b>11.3</b>	<b>4.56</b>	<b>40.7</b>	<b>159</b>	<b>67.5</b>	<b>319</b>	<b>1.59</b>	<b>70.8</b>
#SY	5	5	5	5	5	5	5	5	4
<b><u>Combined</u></b>									
AC Metcalfe	80.9	11.7	4.92	42.3	153	69.0	227	1.52	73.2
CDC Copeland	81.3	11.2	4.89	44.0	130	59.8	182	1.51	83.2
<b>TR06294</b>	<b>82.2</b>	<b>11.2</b>	<b>4.79</b>	<b>43.3</b>	<b>145</b>	<b>69.8</b>	<b>271</b>	<b>1.53</b>	<b>75.8</b>
#SY	9	9	9	9	9	9	9	9	7

Year: 2009

Trial: SAC Barley Area 1 & 2.

Row	Entry	Kernen (KG/HA)	Redvers (KG/HA)	Regina (KG/HA)	Scott (KG/HA)	Swift Current (KG/HA)	Watrous (KG/HA)	#SY	Combined Mean (KG/HA)	Combined Mean (%)
2	AC Metcalfe	4790	4580	7187	4762	2998	7136	6	5242	100
2	CDC Cowboy	5073	5201	6448	4721	2193	8634	6	5369	102
2	CDC Coalition	5129	4972	7627	5810	2927	8612	6	5846	112
2	Champion	6014	5628	7817	6041	3236	8699	6	6239	119
2	CDC Mindon	4836	4930	7061	4531	2630	7239	6	5204	99
2	CDC Landis	5456	5245	7153	5303	2199	9261	6	5769	110
2	CDC Meredith	5584	5712	7648	5959	3020	7675	6	5933	113
2	CDC Reserve	5353	5356	7725	5337	2977	8333	6	5847	112
2	Bentley	5577	5831	7639	5117	2417	9520	6	6009	115
2	Merit 16	4983	5332	7335	5239	2508	7581	6	5496	105
2	Merit 57	5459	4308	7489	5527	2283	8245	6	5552	106
2	Norman	5025	3890	6348	4923	2581	8437	6	5187	99
2	CDC Austensor	6025	6062	7587	5773	2628	10172	6	6375	122
2	TR 06294	5646	4762	8016	5562	3135	10089	6	6202	118
2	TR06297	5492	5641	7727	5729	2484	8455	6	5921	113
2	TR07728	5798	5678	7565	5713	2744	9143	6	6107	116
2	Busby	5039	4884	6611	5049	2457	7733	6	5286	101
2	CDC Carter	4872	5096	6458	4741	1883	8436	6	5277	101
2	HB705	4618	4631	5874	4075	1341	7533	6	4679	89
2	HB402	4509	3551	5897	4430	666	8174	6	4681	89
GRAND MEAN		5263.9	5064.5	7160.5	5217.2	2465.3	8455.3		5611.1	
CV		3.5	9.4	3.8	4.4	10.3	7.4		9.7	
LSD		304.0	786.5	454.0	381.3	421.2	1033.0		357.2	
No. of Reps		3	3	3	3	3	3		18	

Row	Entry	Kernen (KG/HA)	Redvers (KG/HA)	Regina (KG/HA)	Scott (KG/HA)	Swift Current (KG/HA)	Watrous (KG/HA)	#SY	Combined Mean (KG/HA)	Combined Mean as % Metcalfe
6	CDC Clyde	5486	3543	7757	4538	2408	9105	6	5473	104
6	CDC Kamsack	5225	3231	7123	4380	2226	8849	6	5154	98
6	CDC Mayfair	5311	4096	7586	4457	2453	9335	6	5540	106
6	Chigwell	5832	4265	8411	5109	2452	10169	6	6040	115
6	SR420	5214	3739	8102	4337	3022	8248	6	5444	104
GRAND MEAN		5413.6	3774.8	7795.8	4564.4	2512.3	9141.3		5530.0	
CV		3.9	7.3	2.8	4.3	14.3	3.0		8.0	
LSD		397.8	516.2	410.3	372.1	693.3	514.1		293.9	
No. of Reps		3	3	3	3	3	3		18	