AAC SYNERGY

Two-rowed, a cross of TR02267/Newdale, registered in 2012, and was developed by Dr. Bill Legge, Brandon Research Centre, Agriculture and Agri-Food Canada (AAFC).

Agronomic traits

- 13% higher yield than AC Metcalfe, 7% better than CDC Copeland
- Good resistance to lodging
- Heavier, plumper kernels
- Maturation similar to AC Metcalfe
- Moderately resistant to net blotch and spot blotch

Malting quality traits

- Higher extract than AC Metcalfe
- Lower barley protein
- Average soluble protein
- Color similar to AC Metcalfe
- Enzyme levels lower than AC Metcalfe, higher than CDC Copeland
- Beta-glucan lower than AC Metcalfe and CDC Copeland

Brewing quality traits

- Good overall brew house performance
- Conversion time comparable to AC Metcalfe and CDC Copeland
- Lautering performance similar to AC Metcalfe and CDC Copeland
- Good yield and material efficiencies
- High fermentability

Overall comments

AAC Synergy represents a variety with significantly improved yield, and maturity similar to AC Metcalfe. It performs well in the malting and brewing processes; its malt exhibits very high extract yield with enzymes lower than AC Metcalfe but higher than CDC Copeland; the malt showed fast conversion and good lautering, and its wort showed good color and excellent fermentability.

Comparative malt quality parameters

CMBTC CANADIAN MALTING BARLEY TECHNICAL CENTRE	AAC Synergy	AC Metcalfe	CDC Copeland
Fine Extract, %	~82.1	~81.5	~81.0
Color, EBC	4.0 - 4.4	3.0 - 4.5	2.0 - 3.5
Total Protein, %	~10.5	~12.5	~12.5
Soluble Protein, %	4.4 - 5.3	4.7 - 5.3	4.5 - 5.0
Kolbach Index	41 - 48	42 - 48	42 - 44
Diastatic Power, °L	100 - 135	110 - 150	100 - 130
Wort Beta - Glucan, ppm	65 - 110	70 - 120	70 - 110
FAN, ppm (Mean ± Std.)	194 ± 13.2	218 ± 27.9	194 ± 31.2

cmbtc.com

For more information

Peter Watts — **Managing Director**
Telephone 204-983-1981
Fax 204-984-5843
E-mail pwatts@cmbtc.com

Dr. Yueshu Li — **Director of Malting & Brewing Operations**
Telephone 204-984-0561
Fax 204-984-5843
E-mail yli@cmbtc.com

Canada

Request for Support for Registration of AAC Synergy (TR09208)

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: TR09208, BM0215-189-1
Pedigree: TR02267/Newdale
Area of Adaptation: Western Canada

Description:

TR09208 is a promising two-row hulled malting barley line widely adapted to western Canada that was 13% higher yielding than AC Metcalfe and 7% higher yielding than CDC Copeland over 2 years of testing across all soil zones. It has shorter, stronger straw and heavier, plumper kernels than the checks combined with similar days to heading and maturity. TR09208 has a good disease resistance package overall, including resistance to spotted net blotch, moderate resistance to netted net blotch and spot blotch, moderately resistant to moderately susceptible reactions to stem rust, common root rot and surface borne smuts, moderately susceptible to fusarium head blight (FHB), and susceptible to scald, loose smut and Septoria. TR09208 has a desirable malting quality profile with higher malt extract than AC Metcalfe and CDC Copeland combined with consistently lower beta glucan content and viscosity. It was similar to intermediate between the checks for most other malting quality traits, including barley and malt protein, soluble protein, diastatic power, alpha amylase, friability and FAN. It was also similar to the checks in resistance to hull peeling. Overall, TR09208's excellent combination of agronomic traits, disease resistance and malting quality should make it a useful two-row malting barley cultivar for western Canadian producers and the malting and brewing industry.

Strengths:

- 13% higher yielding than AC Metcalfe and 7% higher yielding than CDC Copeland.
- Shorter, stronger straw.
- Heavier, plumper kernels.
- Similar to the checks in days to heading and maturity.
- Resistance to spotted net blotch.
- Moderate resistance to netted net blotch and spot blotch.
- Higher malt extract than AC Metcalfe and CDC Copeland combined with consistently lower beta glucan content and viscosity.

Neutral characteristics:

- Lower test weight than AC Metcalfe.
- Moderately resistant to moderately susceptible reactions to stem rust, common root rot, and surface borne smuts.
- Similar to intermediate between AC Metcalfe and CDC Copeland for most malting quality traits, including barley and malt protein, soluble protein, diastatic power, alpha amylase, friability and FAN.
- Similar to the checks in resistance to hull peeling.

Weaknesses:

- Moderately susceptible to FHB.
- Susceptible to scald, loose smut and Septoria.

Table 1. Grain yield (kg/ha) for TR09208 and checks from the 2009 and 2010 Western Cooperative Two-row Barley Registration Test

	Black Soil Zone		Black-Grey Soil Zone		Brown Soil Zone		Combined	
Entry	Yield (kg/ha)	Yield as % Metcalfe	Yield (kg/ha)	Yield as % Metcalfe	Yield (kg/ha)	Yield as % Metcalfe	Yield (kg/ha)	Yield as % Metcalfe
2009								
CDC Copeland	7173	109	6199	107	5595	111	6294	109
Xena	7620	116	6581	114	6152	122	6771	118
AC Metcalfe	6578	100	5771	100	5057	100	5762	100
TR09208	***7282***	***111***	***6275***	***109***	***5820***	***115***	***6443***	***112***
#SY	6		4		7		17	
2010								
CDC Copeland	4288	94	5490	103	6159	101	5433	100
Xena	5100	112	6378	119	6690	109	6146	113
AC Metcalfe	4552	100	5347	100	6124	100	5453	100
TR09208	***5409***	***119***	***6042***	***113***	***6870***	***112***	***6216***	***114***
#SY	4		4		6		14	
Combined								
CDC Copeland	6019	104	5844	105	5856	106	5905	105
Xena	6612	115	6479	117	6400	115	6489	115
AC Metcalfe	5767	100	5559	100	5550	100	5622	100
TR09208	***6533***	***113***	***6159***	***111***	***6305***	***114***	***6341***	***113***
#SY	10		8		13		31	

Table 2. Agronomic characteristics for TR09208 and checks from the 2009 and 2010 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")
Combined							
CDC Copeland	60.8	97.9	80.4	5.0	63.7	45.8	89.3
Xena	59.4	98.1	75.2	3.6	65.3	46.5	87.7
AC Metcalfe	59.6	97.9	76.0	3.6	65.2	44.6	88.9
TR09208	***59.6***	***98.3***	***74.6***	***3.0***	***64.6***	***47.2***	***91.9***
#SY	26	25	33	3	30	30	23

Table 3. Disease reactions for TR09208 and checks from the 2009 and 2010 Western Cooperative Two-row Barley Registration Test

	Net Blotch				Spot Blotch				CRR	
	Winnipeg			Melf	Bran	Melf	Sask-	Winnipeg	Lacombe	
Entry	102	858	857	-ort	-don	-ort	atoon	1903	%	Rating
2009										
CDC Copeland	2	10	3	1.0	7.5	6.0	7.0	5	53	MS
Xena	9	10	7	2.0	5.5	3.5	5.0	6	44	MRMS
AC Metcalfe	9	10	5	4.5	5.5	3.0	4.5	4	51	MS
TR09208	***2?***	***8***	***1***	***1.0***	***3.5***	***2.0***	***2.0***	***4***	***51***	***MS***
2010										
CDC Copeland	3	9	3	1.0	8.5	7.5	7.5	7, 6	64	S
Xena	9	10	7	1.5	8.0	6.0	5.5	8	35	R
AC Metcalfe	9	9	3	3.5	7.0	4.5	4.0	7, 6	41	MR
TR09208	***1***	***3***	***2***	***1.5***	***3.5***	***3.0***	***2.5***	***3, 4***	***49***	***MRMS***

Table 3. Disease reactions (continued)

	Winnipeg	Scald			Smuts			
	Septoria	Winnipeg	Edmon	Laco	Sask.	Winnipeg		
Entry	1998	1493	-ton	-mbe	Covered	U. nuda	U. hordei	U. nigra
2009								
CDC Copeland	-	S	7.0	5.0	S	25.0 a	42.5	22.5
Xena	-	S	6.5	3.0	S	76.0	12.5	30.0
AC Metcalfe	-	MS	6.0	3.0	MS	0.0	25.0	32.5
TR09208	***-***	***S***	***7.0***	***4.5***	***S***	***83.0***	***27.5***	***10.0***
2010								
CDC Copeland	S	-	7.5	7.5	8.0	100.0a	40.0	13.0
Xena	S	-	8.0	7.5	16.0	100.0	25.0	10.0
AC Metcalfe	S	-	6.0	6.0	5.0	ai	20.0	3.0
TR09208	***S***	***-***	***7.0***	***7.0***	***17.0***	***100.0***	***41.5b***	***30.0b***

Table 3. Disease reactions (continued)

	Stem Rust				FHB - Brandon		FHB – Portage	
	Field Rating - Wpg		MCC	Rpg1	FHB	DON	FHB	DON
Entry	Sr Sev	Sr IR	IT	Marker	Rating	ppm	Rating	ppm
2009								
CDC Copeland	5.0	mr	;1-	+	2.5	20.4	2.3	7.0
Xena	5.0	mr	;1-	+	2.2	13.9	2.3	12.4
AC Metcalfe	5.0	mr	;1-	+	2.2	13.0	2.5	8.5
TR09208	***1.0***	***r***	***0;***	***+***	***3.2***	***23.6***	***2.3***	***13.1***
2010								
CDC Copeland	2.0	r	0;	+	3.5	33.7	2.5	26.2
Xena	5.0	r	0;	+	3.0	22.2	2.5	14.7
AC Metcalfe	2.0	r	0;	+	2.3	28.0	2.5	31.9
TR09208	***2.0***	***r***	***0;***	***+***	***3.5***	***39.6***	***2.0***	***36.3***

Table 4. Malting quality characteristics for TR09208 and checks from the 2009 and 2010 Western Cooperative Two-row Barley Registration Test

Entry	Plump (%>7/64")	Plump (%>6/64")	Kernel Weight (g/1000k)	Grain Protein %	G.E. 4ml %	G.E. 8ml %	Steepout Moist. %	Fine Extract %
Combined								
CDC Copeland	50.7	93.2	44.0	10.9	97	91	46.0	80.6
AC Metcalfe	56.7	93.0	43.2	11.4	97	88	45.8	81.1
TR09208	***72.2***	***95.1***	***46.2***	***10.8***	***96***	***86***	***46.4***	***81.3***
#SY	4	6	6	6	6	6	6	6

Table 4. (continued)

Entry	Soluble Protein %	Ratio S/T %	Diastatic Power °L	Alpha Amylase D.U.	Beta Glucan ppm	Viscosity cps	FAN mg/L	Friability %
Combined								
CDC Copeland	4.6	42.1	111	55.5	106	1.45	168	86.4
AC Metcalfe	4.8	42.8	132	74.1	131	1.45	183	78.3
TR09208	***4.8***	***45.4***	***121***	***66.5***	***67***	***1.42***	***177***	***85.5***
#SY	6	6	6	6	6	6	6	4

Table 4. (continued)

Entry	PUG %	WUG %	Malt Peeled %
Combined			
CDC Copeland	0.8	0.5	3.7
AC Metcalfe	2.8	0.4	4.9
TR09208	***2.0***	***0.6***	***3.7***
#SY	4	4	4

Table 5. Malting quality characteristics for TR09208 and checks from the 2010 and 2011 Collaborative Trials

Entry	Plump (%>7/64")	Plump (%>6/64")	Grain Protein %	G.E. 4ml %	G.E. 8ml %	Barley P & B %	Malt P & B %	Fine Extract %
2010								
AC Metcalfe	81.0	96.7	11.3	97	87	1.9	1.6	81.6
CDC Copeland	85.9	97.9	10.8	98	89	1.8	1.9	81.3
TR09208	***91.1***	***98.6***	***11.1***	***97***	***81***	***2.0***	***3.0***	***82.2***
#SY	2	4	5	5	5	5	2	5
2011								
AC Metcalfe	65.2	94.0	12.1	99	93	3.6	5.7	80.8
CDC Copeland	57.6	92.1	11.3	98	86	2.5	3.8	80.6
TR09208	***72.1***	***95.3***	***11.3***	***99***	***91***	***4.0***	***4.2***	***81.7***
#SY	6	6	6	6	6	5	5	6
Combined								
AC Metcalfe	69.2	95.1	11.7	98	90	2.7	4.5	81.2
CDC Copeland	64.7	94.4	11.1	98	87	2.2	3.2	80.9
TR09208	***76.8***	***96.6***	***11.2***	***98***	***86***	***3.0***	***3.9***	***81.9***
#SY	8	10	11	11	11	10	7	11

Table 5. (continued)

Entry	Malt Prot. %	Sol. Prot. %	Ratio S/T %	Diastatic Power °L	Alpha Amylase D.U.	Beta Glucan ppm	Visco-sity cps	Friab -ility %	FAN mg/L
2010									
AC Metcalfe	10.8	5.5	51.7	155	76.3	102	1.43	87.1	245
CDC Copeland	10.5	5.3	50.6	142	65.6	98	1.43	93.4	222
TR09208	**10.6**	**5.2**	**49.8**	**146**	**71.5**	**84**	**1.40**	**91.1**	**224**
#SY	5	5	5	5	5	5	5	3	5
2011									
AC Metcalfe	11.7	5.1	44.3	153	73.2	184	1.49	72.7	222
CDC Copeland	11.3	4.8	42.8	134	58.7	169	1.49	82.2	203
TR09208	***11.1***	***5.2***	***47.5***	***144***	***71.4***	***127***	***1.46***	***76.5***	***222***
#SY	6	6	6	6	6	6	6	4	6
Combined									
AC Metcalfe	11.3	5.3	47.7	154	74.6	147	1.46	78.9	232
CDC Copeland	10.9	5.0	46.4	138	61.9	137	1.47	88.0	211
TR09208	***10.8***	***5.2***	***48.5***	***145***	***71.5***	***108***	***1.43***	***83.3***	***223***
#SY	11	11	11	11	11	11	11	7	11