#### APPLICATIONS UNDER EXAMINATION

**BARLEY** 

**BARLEY** 

(Hordeum vulgare)

'Bentley' **Proposed denomination:** 08-6331 **Application number: Application date:** 2008/05/06

**Applicant:** Alberta Agriculture and Rural Development, Lacombe, Alberta

**Agent in Canada:** Canterra Seeds Holdings Ltd., Winnipeg, Manitoba

**Breeder:** James H. Helm, Alberta Agriculture and Rural Development, Lacombe, Alberta

Variety used for comparison: 'AC Metcalfe'

Summary: The plants of 'Bentley' are taller in height than those of 'AC Metcalfe'. 'Bentley' has flag leaf and spike that are longer than those of 'AC Metcalfe'. The frequency of plants with recurved flag leaves is medium in 'Bentley' whereas it is low in 'AC Metcalfe'. 'Bentley' has strong intensity of anthocyanin colouration on the auricules of the flag leaves whereas it is medium in 'AC Metcalfe'.

## **Description:**

PLANT: two row, spring malting barley, semi-erect juvenile growth habit, absent or very sparse pubescence on the sheaths of the lower leaves

FLAG LEAF: medium frequency of plants with recurved flag leaves, absent or very sparse pubescence

FLAG LEAF SHEATH: absent or very weak glaucosity, weak pubescence

AURICLES: strong anthocyanin colouration, weak pubescence on the margins

SPIKE: mid-season spike emergence, platform shaped collar, weak anthocyanin colouration of the tips of the lemma awns, semi-erect attitude, weak glaucosity, parallel shape, medium density, divergent attitude of sterile spikelet, the length of the glume and its awn of the median spikelet is shorter relative to the grain

FIRST SEGMENT OF RACHIS: medium length, absent or very weak curvature LEMMA AWNS: longer relative to the spike, rough spiculations on margins

KERNEL: absent or very weak anthocyanin colouration of nerves of the lemma at beginning of ripening, whitish aleurone layer, husk present, long rachilla hair, absent or very weak spiculation of inner lateral nerves of dorsal side of lemma, no hairiness on ventral furrow, medium length, medium width

AGRONOMY: fair resistance to lodging, fair resistance to shattering, good tolerance to straw breakage, fair tolerance to drought, good malting quality

Origin and Breeding: 'Bentley' (experimental designations FB414, H93103, and TR05669) was developed at the Field Crop Development Center, Lacombe, Alberta, using a modified bulk pedigree system. It arose from the cross I92125/TR229 in 1993. The F2-F6 generations were grown in bulk from 1994 to 1998. The line H93103004 was selected from the F6-F7 to be grown in yield trials from 2000 to 2007. Selection criteria included grain yield, forage yield, test weight, 1000 kwt, lodging resistance, disease resistance, maturity, and malting quality. It was further tested as TR05669 in the Western Two Row Barley Cooperative, and as FB414 in the Western Forage Barley Cooperative in 2005.

Tests and Trials: Tests and trials were conducted during the summers of 2008 and 2009 in Lacombe, Alberta. Plots consisted of 8 rows with a row spacing of 0.14 meters and a row length of 2.5 meters. There were 3 replicates.

Comparison table for 'Bentley'

OUTHPATIOUT TABLE			
	<b>'Bentley'</b>	'AC Metcalfe'*	
Flag leaf length (cm	)		
mean 2008	´ 14.9	12.4	
std deviation	1.62	2.78	



mean 2009 std deviation	10.7 0.92	7.5 0.69
Spike length (cm) mean 2008 std deviation mean 2009 std deviation	8.8 0.52 8.8 0.65	6.7 0.61 6.2 0.40
Plant height (cm) mean 2008 std deviation mean 2009 std deviation	89.75 5.25 61.9 2.17	85.25 6.4 59.2 3.1
*reference variety		





Barley: 'Bentley' (left) with reference variety 'Metcalfe' (right)

**Proposed denomination: 'Busby' Application number:** 08-6470 **Application date:** 2008/11/26

Applicant: Alberta Agriculture and Rural Development, Lacombe, Alberta

Breeder: Patricia Juskiw, Alberta Agriculture and Rural Development, Lacombe, Alberta

Variety used for comparison: 'Seebe'

**Summary:** 'Busby' has strong intensity of anthocyanin colouration on the auricles of the flag leaves whereas it is very strong in 'Seebe'. The spike emergence of 'Busby' tends to be earlier than 'Seebe'. 'Busby' has a medium intensity colouration of the tips of the lemma awns whereas it is strong in 'Seebe'. The flag leaf of 'Busby' is narrower than 'Seebe'. 'Busby' has a medium frequency of plants with recurved flag leaves whereas it is high in 'Seebe'. The spike of 'Busby' is recurved whereas it is horizontal in 'Seebe'.

## **Description:**

PLANT: two row, spring feed barley, semi-erect juvenile growth habit, absent or very sparse pubescence on the sheaths of the lower leaves

FLAG LEAF: medium frequency of plants with recurved flag leaves, weak pubescence

FLAG LEAF SHEATH: medium glaucosity, weak pubescence

AURICLES: strong anthocyanin colouration, weak pubescence on the margins

SPIKE: early spike emergence, platform shaped collar, medium anthocyanin colouration of the tips of the lemma awns, recurved attitude, weak glaucosity, parallel shape, medium density, divergent attitude of sterile spikelet, the length of the glume and its awn of the median spikelet is equal relative to the grain

FIRST SEGMENT OF RACHIS: medium length, absent or very weak curvature LEMMA AWNS: longer relative to the spike, rough spiculations on margins

KERNEL: absent or very weak anthocyanin colouration of nerves of the lemma at beginning of ripening, whitish aleurone layer, husk present, long rachilla hair, absent or very weak spiculation of inner lateral nerves of dorsal side of lemma, no hairiness on ventral furrow, medium length, medium width

AGRONOMY: good resistance to lodging, good resistance to shattering, good tolerance to straw breakage, fair tolerance to drought

**Origin and Breeding:** 'Busby' (experimental designations H94034003 and TR06673) was developed at the Field Crop Development Center, Lacombe, Alberta using a modified bulk pedigree system. It arose from the cross H93089(F1)/Seebe in 1994. The line H94034003 was selected from the F7 head rows to be grown in yield trails from 2001 to 2007. It was further tested as TR06673 in the Western Two Row Barley Cooperative Test in 2006 and 2007. The selection criteria included grain yield, test weight, 1000 kwt, lodging resistance, disease resistance and maturity.

**Tests and Trials:** Tests and trials were conducted during the summers of 2008 and 2009 in Lacombe, Alberta. Plots consisted of 8 rows with a row spacing of 0.14 meters and a row length of 2.5 meters. There were 3 replicates.

Comparison table for 'Busby'

	'Busby'	'Seebe'*
Flag leaf width (mm)		
mean 2008 ` ´	10.5	12.4
std deviation	1.67	1.23
mean 2009	7.3	9
std deviation	0.80	0.79



Barley: 'Busby' (left) with reference variety 'Seebe' (right)

**Proposed denomination: 'Celebration' Application number:** 09-6650 **Application date:** 2009/05/29

Applicant:BARI-Canada, Inc., Winnipeg, ManitobaAgent in Canada:Canterra Seeds Ltd., Winnipeg, Manitoba

Breeder: Blake Cooper, Busch Agricultural Resources Inc., Fort Collins, Colorado, United States of

America

Varieties used for comparison: 'Legacy' and 'Tradition'

**Summary:** 'Celebration' has a shorter, narrower flag leaf than 'Tradition'. The spike collar of 'Celebration' is v-shaped while it is platform shaped in 'Legacy' and 'Tradition'. 'Celebration' has a smooth lemma awn while it is semi-smooth in 'Legacy' and 'Tradition'. The spike length of 'Celebration' is shorter than in 'Legacy'. 'Celebration' has short rachilla hair on the kernel while it is long in 'Legacy' and 'Tradition'.

### **Description:**

PLANT: spring type, 6 row, malting barley, erect growth habit at the 5-9 tiller stage, absent or very sparse pubescence on the lower leaf sheaths at the 5-9 tiller stage, mid-season spike emergence

FLAG LEAF: no anthocyanin colouration of the auricles, weak to medium glaucosity of the sheath, weak pubescence on the blade and sheath

SPIKE: weak glaucosity at the end of anthesis, erect to semi-erect attitude at the end of anthesis, v-shaped collar, parallel shape, lax to medium density, absent to weak anthocyanin colouration of the nerves of the kernel lemma at the early to soft dough stage, longer glume and its awn relative to the grain of the median spikelet

FIRST SEGMENT OF RACHIS: short to medium length, medium curvature

LEMMA AWNS: strong intensity of anthocyanin colouration of the tips at anthesis, equal to longer when compared to the spike, smooth spiculation of the margin

KERNEL: whitish aleurone layer, short rachilla hair, husk present, weak spiculation of the inner lateral nerves of the dorsal side of the lemma, hairiness of ventral furrow present, clasping lodicules, horseshoe shaped basal markings, medium length, medium width

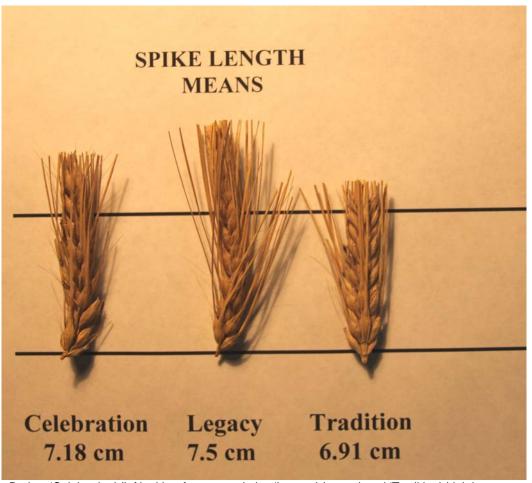
AGRONOMICS: fair to good lodging resistance, fair resistance to shattering, fair tolerance to straw breakage, fair tolerance to drought, good malting quality

Origin and Breeding: 'Celebration' (experimental designations BT980, 6B01-2218) is derived from the cross 6B94-7378 / C96-2292 made in 1998 in Fort Collins, Colorado. The female parent, 6B94-7378 is 6B86-3131 / Excel and the male parent, C96-2292 is B89-2027 / M84. The breeding method used was a modified pedigree system using single seed descent. The F1 generation was grown in a greenhouse in the fall/winter of 1998/1999 and subsequently planted as an F2 population in Moorhead, Minnesota in 1999. The F3 generation was grown as a single seed descent in a greenhouse in the fall of 1999. In 2000, 95 single seed descent individual F4 rows were grown in Langdon, North Dakota. One row was selected based on agronomics, NIR scores for protein, predicted extract, and Fusarium Head Blight and was increased as an F5 plot (AZ 0343) in a counter season nursery in Yuma, Arizona in the fall winter of 2000/2001. The designation 6B01-2218 was assigned to this experimental line. This line was tested in replicated yield trials in North Dakota from 2001-2005 and regional trials from 2003-2005.

**Tests and Trials:** Tests and trials were conducted during the summers of 2008 and 2009 in Neapolis, Alberta. Plots consisted of 5 rows, with a row length of 5 meters and a row spacing of 25 centimeters. There were 3 replications with each variety occurring 4 times in each replication.

Comparison table for 'Celebration'

) 1: 3 1 7 1 4 1	5.7 .29 1.6	19.1 0.95 12.7 1.23
3 1 1 1 1 1	1.6	0.95 12.7
3 1 1 1 1 1	1.6	0.95 12.7
3 1 1 1 1 1	1.6	0.95 12.7
1 1	1.6	12.7
1		
	.01	1.23
) 1.	4.0	17.0
3 0	).94	0.64
5 1:	2.0	13.0
1.	.14	0.92
7	7.6	6.9
0	).38	0.32
7	'.4 (	6.9
0	).29	0.32
	3 C	3 0.38 7.4



Barley: 'Celebration' (left) with reference varieties 'Legacy' (centre) and 'Tradition' (right)

**Proposed denomination:** 'Chigwell' **Application number:** 08-6327 **Application date:** 2008/05/05

Applicant: Alberta Agriculture and Rural Development, Lacombe, Alberta

**Agent in Canada:** SeCan Association, Kanata, Ontario

Breeder: James H. Helm, Alberta Agriculture and Rural Development, Lacombe, Alberta

Varieties used for comparison: 'Sundre' and 'Vivar'

Summary: 'Chigwell' has a lower frequency of plants with recurved flag leaves than the reference varieties. 'Chigwell' has wider flag leaves than the reference varieties. The intensity of anthocyanin colouration of flag leaf auricle of 'Chigwell' is absent whereas it is weak for 'Vivar'. 'Chigwell' has a medium spike density whereas it is lax in 'Sundre'. The spike attitude of 'Chigwell' is semi-erect whereas it is horizontal in 'Sundre'. 'Chigwell' has a longer first segment of the rachis than 'Sundre'. The tips of the lemma awns in 'Chigwell' have a strong intensity of anthocyanin colouration whereas it is weak in 'Vivar'. 'Chigwell' has a weak curvature of first segment of rachis whereas 'Sundre' has no curvature and 'Vivar' has medium curvation. The plants of 'Chigwell' are taller than those of 'Vivar'. 'Chigwell' has shorther rachilla hair of the kernel than 'Sundre'. The spikes of 'Chigwell' are shorter than those of 'Sundre'.

#### **Description:**

PLANT: six row, spring feed barley, semi-erect juvenile growth habit, absent or very sparse pubescence on the sheaths of the lower leaves

FLAG LEAF: low frequency of plants with recurved flag leaves, weak pubescence

FLAG LEAF SHEATH: absent or very weak glaucosity, weak pubescence

AURICLES: very weak anthocyanin colouration, weak pubescence on the margins

SPIKE: mid-season spike emergence, platform shaped collar, strong anthocyanin colouration of the tips of the lemma awns, semi-erect attitude, absent or very weak glaucosity, tapering shape, medium density, the length of the glume and its awn of the median spikelet is longer relative to the grain

FIRST SEGMENT OF RACHIS: medium length, weak curvature

LEMMA AWNS: longer relative to the spike, semi-smooth spiculations on margins

KERNEL: strong anthocyanin colouration of nerves of the lemma at beginning of ripening, whitish aleurone layer, short rachilla hair, husk present, no hairiness on ventral furrow, medium length, medium width

AGRONOMY: good resistance to lodging, good resistance to shattering, good tolerance to straw breakage, fair tolerance to drought

**Origin and Breeding:** 'Chigwell' (experimental designations BT577, H98075009, and FB418) was developed at the Field Crop Development Center, Lacombe, Alberta using a single seed descent system. It arose from the cross Mahigan/H87020005 in 1998. H98075009 was selected from the F5 generation to be advanced into yield trials. It was further tested as BT577 in the Western Six Row Barley Cooperative Test and as FB418 in the Western Forage Barley Coop. Selection criteria included grain yield, test weight, 1000 kwt, lodging resistance, disease resistance and maturity.

**Tests and Trials:** Tests and trials were conducted during the summers of 2008 and 2009 in Lacombe, Alberta. Plots consisted of 8 rows with a row spacing of 0.14 meters and a row length of 2.5 meters. There were 3 replicates.

Comparison	table 1	for 'C	higwell'
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	'Chigwell'	'Sundre'*	'Vivar'*
Spike length (cm)			
mean 2008	6	7.4	5.5
std deviation	0.53	0.44	0.39
mean 2009	5.3	6.8	5.1
std deviation	0.42	0.57	0.44
Flag leaf length (cm)			
mean 2008	15	18.2	13.6
std deviation	1.52	1.93	2.21
mean 2009	10	12.1	9.6
std deviation	1.05	1.51	1.27
Flag leaf width (mm)			
mean 2008 ` ´	18	15.5	13.2
std deviation	1.59	1.47	1.35
mean 2009	13.1	15.5	11.2
std deviation	1.28	0.77	1.01
Plant height (cm)			
mean 2008	92.95	94.75	90.25
std deviation	3.46	3.43	3.8
mean 2009	57.4	62.65	48.2
std deviation	4.03	2.16	3.04
*reference varieties			



Barley: 'Chigwell' (centre) with reference varieties 'Sundre' (left) and 'Vivar' (right)

**Proposed denomination:** 'Norman' Application number: 08-6334 Application date: 2008/05/13

Applicant:Agriculture & Agri-Food Canada, Brandon, ManitobaAgent in Canada:Agriculture & Agri-Food Canada, Lacombe, Alberta

**Breeder:** Bill Legge, Agriculture & Agri-Food Canada, Brandon, Manitoba

Varieties used for comparison: 'CDC Kendall', 'AC Metcalfe' and 'Harrington'

Summary: 'Norman' has a low to medium frequency of plants with recurved flag leaves while it is medium to high for 'CDC Kendall' and absent to very low for 'AC Metcalfe' and 'Harrington'. The intensity of anthocyanin colouration of the auricles of the flag leaves of 'Norman' is medium to strong while it is very weak to weak for 'AC Metcalfe'. 'Norman' has sparse pubescence on the auricles of the flag leaves while it is absent to very sparse for 'AC Metcalfe' and 'Harrington'. The lemma awns at anthesis of 'Norman' have medium to strong intensity of anthocyanin colouration while it is very weak in 'AC Metcalfe'. 'Norman' has a longer spike than 'AC Metcalfe'. The length of the first segment of the rachis of 'Norman' is shorter than in 'CDC Kendall' and 'Harrington'. 'Norman' has a weak curvature of the first segment of the rachis while it is medium to strong curvature in 'CDC Kendall'. The spiculation of inner lateral nerves of the dorsal side of the lemma of the kernel in 'Norman' is weak to medium while it is absent to very weak in 'Harrington'. 'Norman' mainly has horseshoe shaped basal markings on the kernel while it is mainly incomplete horseshoe shaped markings in 'CDC Kendall'. 'Norman' has fair to good resistance to lodging while it is poor to fair in 'Harrington'.

### **Description:**

PLANT: spring type, 2-row, malting barley, erect to semi-erect growth habit at the 5-9 tiller stage, absent to very sparse pubescence on the lower leaf sheaths at the 5-9 tiller stage, low to medium frequency of plants with recurved flag leaves, mid season spike emergence

FLAG LEAF: medium to strong intensity of anthocyanin colouration of the auricles, weak pubescence along the margins of the auricles, medium to strong glaucosity of the sheath, absent to very weak pubescence on the sheath, weak pubescence on the blade

SPIKE: medium to strong glaucosity at the end of anthesis, semi-erect to horizontal attitude at the end of anthesis, closed cup collar with V shape, parallel shape, medium density, absent or very weak anthocyanin colouration of the nerves of the lemma of the kernel at the soft dough stage, weak curvature of first segment of rachis, divergent sterile spikelet attitude, longer glume and its awn relative to grain of median spikelet

LEMMA AWNS: medium to strong intensity of anthocyanin colouration of the tips at the beginning of anthesis, longer when compared to spike, rough spiculation along margin

KERNEL: whitish aleurone layer, long rachilla hair, husk present, weak to medium spiculation of inner lateral nerves of dorsal side of lemma, no hairiness of ventral furrow, clasping disposition of lodicules, horseshoe shaped basal markings

AGRONOMICS: fair to good resistance to lodging, good to very good malting quality

DISEASE RESISTANCE: very susceptible to True Loose Smut (*Ustilago nuda*); susceptible to Spot Blotch (*Cochliobolus sativus*), Septoria Speckled Leaf Blotch (*Septoria passerinii*), Scald (*Rhynchosporium secalis*), Stem Rust (*Puccinia graminis*), Covered Smut (*Ustilago hordei*), False Loose Smut and Black Semi-Loose Smut (*Ustilago nigra*) and Barley Yellow Dwarf virus; moderately susceptible to Common Root Rot (*Cochliobolus sativus, Fusarium* spp.) and Net Blotch netform (*Pyrenophora teres*); moderately resistant to Fusarium Head Blight (*Fusarium graminearum*, perfect state *Gibberella zeae*) and resistant to Net Blotch spot form (*Pyrenophora teres*)

Origin and Breeding: 'Norman' (experimental designation TR05915, CDC KendallDT002-4) is a doubled haploid line selected from 'CDC Kendall' using in vitro selection with deoxynivalenol (DON) during the anther culture step at Agriculture & Agri-Food Canada's Brandon Research Centre, Brandon, Manitoba in 2000. 5 doubled haploid plants were produced, one of which became 'CDC KendallDT002-4'. They were grown in a greenhouse and were individually harvested in October 2000. In 2001, 'CDC KendallDT002-4' was planted in an FHB nursery in Brandon, Manitoba and was evaluated visually on a 0-5 scale for FHB reaction, row harvested by hand, threshed and cleaned. A 1 gram ground subsample was sent to ECORC-AAFC, Ottawa for DON analysis. 'CDC KendallDT002-4' had lower DON concentration than 'CDC Kendall' and was advanced to preliminary yield tests at Brandon, Manitoba in 2002-2003. In 2003, it was evaluated in a FHB nursery in Charlottelown, PEI. It was evaluated in an advanced yield test in 2004 and was entered in the 2005-2006 Western Cooperative Two Row barley registration test. It was then evaluated in the 2006-2007 Collaborative Malting Barley Trials. DON analysis were conducted on the cooperative and variety trials and showed that 'Norman' continued to have considerably lower DON content than 'CDC Kendall'. It continued to be evaluated in 5 FHB nurseries from 2005-2007 and was evaluated in the 2006 North American Barley Scab Evaluation Nursery grown in Brandon and 4 locations in the USA.

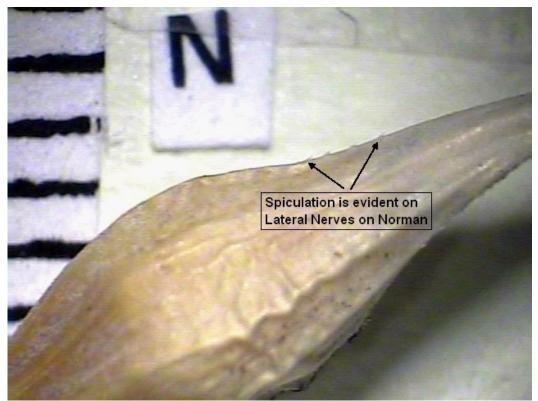
**Tests and Trials:** Tests and trials were conducted during the summers of 2008 and 2009 in Brandon, Manitoba. Plots consisted of 6 rows with a row length of 4 meters and a row spacing of 0.18 meters. Plots were spaced 0.46 meters apart. There were 4 replicates arranged in a RCB design.

Comparison table for 'Norman'

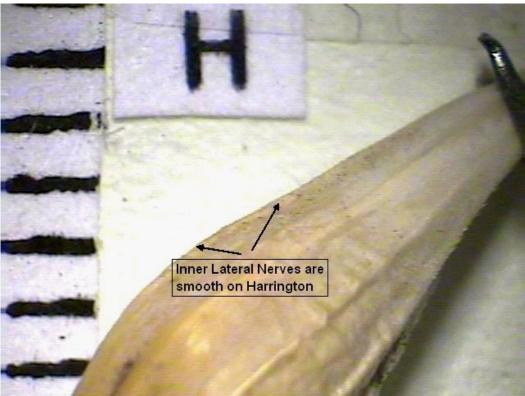
	'Norman'	'CDC Kendall'*	'AC Metcalfe'*	'Harrington'*
Spike length (excluding	g awns)(cm)			
mean 2008	9.5	9.2	8.5	9.5
std. deviation	1.7	1.5	1.3	1.4
mean 2009	9.6	9.1	8.5	9.7
std. deviation	1.1	1.1	0.9	0.9
DON levels (parts per	million) from 2001	to 2007 at the Brandon F	- HB Nursery	
mean (LSD=3.4)	10.4	15.0	15.2	N/A
*reference varieties				



Barley: 'Norman' (top) with reference variety 'CDC Kendall' (bottom)



Barley: 'Norman'



Barley: Reference variety 'Harrington'

**Proposed denomination: 'TR05671' Application number:** 08-6282 **Application date:** 2008/04/07

Applicant: Alberta Agriculture and Rural Development, Lacombe, Alberta

**Breeder:** James H. Helm, Alberta Agriculture and Rural Development, Lacombe, Alberta Patricia Juskiw, Alberta Agriculture and Rural Development, Lacombe, Alberta

Variety used for comparison: 'AC Metcalfe'

**Summary:** 'TR05671' has strong intensity of anthocyanin colouration of auricles whereas it is medium for 'AC Metcalfe'. The spike attitude of 'TR05671' is horizontal whereas it is semi-erect for 'AC Metcalfe'. 'TR05671' has a longer first segment of the rachis than 'AC Metcalfe'. 'TR05671' has longer spikes than 'AC Metcalfe'.

# **Description:**

PLANT: two row, spring malting barley, semi-erect juvenile growth habit, absent or very sparse pubescence on the sheaths of the lower leaves

FLAG LEAF: low frequency of plants with recurved flag leafs, absent or very weak pubescence

FLAG LEAF SHEATH: absent or very weak glaucosity, weak pubescence AURICLES: strong anthocyanin colouration, sparse pubescence on the margins

SPIKE: mid-season spike emergence, platform shaped collar, weak anthocyanin colouration of the tips of the lemma awns, horizintal attitude, weak glaucosity, parallel shape, medium density, divergent attitude of sterile spikelet, the length of the glume and its awn of the median spikelet is shorter relative to the grain

FIRST SEGMENT OF RACHIS: medium length, absent or very weak curvature LEMMA AWNS: longer relative to the spike, rough spiculations on margins

KERNEL: absent or very weak anthocyanin colouration of nerves of the lemma at beginning of ripening, whitish aleurone layer, husk present, long rachilla hair, no hairiness on ventral furrow, medium length, medium width

AGRONOMY: good resistance to lodging, good resistance to shattering, good tolerance to straw breakage, fair tolerance to drought, good malting quality

**Origin and Breeding:** 'TR05671' (experimental designation H93174006) was developed at the Field Crop Development Center, Lacombe, Alberta using a modified bulk pedigree system. It arose from the cross H92076F1/TR238 in 1993. The line H93174006 was selected from the F7 head rows and further selected to be grown in the yield trials from 2000 to 2007. Selection criteria included yield, test weight, 1000 kwt, lodging resistance, disease resistance, maturity and malting quality. It was further tested as TR05671 in the Western Two Row Barley Cooperative Test in 2005 and 2006.

**Tests and Trials:** Tests and trials were conducted during the summers of 2008 and 2009 in Lacombe, Alberta. Plots consisted of 8 rows with a row spacing of 0.14 meters and a row length of 2.5 meters. There were 3 replicates.

Comparison table for 'TR05671'

Companison table for	1 KU301 1	
	'TR05671'	'AC Metcalfe'*
Spike length (cm)		
mean 2008	9.3	6.7
std. deviation	0.95	0.61
mean 2009	8.9	6.2
std deviation	0.59	0.40



Barley: 'TR05671' (left) with reference variety 'Metcalfe' (right)