VALUE ADDED WHEAT CRC PROJECT REPORT

Australian Wheat Varieties:

Grain Quality Data on Recently Registered Varieties

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This report provides quality data on wheat varieties that have recently been registered, thereby supplementing an earlier report, entitled 'Current Australian Wheat Varieties: Grain Quality Data', by Wrigley *et al.* (2001), published as Report No 48 of the Quality Wheat CRC. Also provided in this report is an up-dated table of attributes and genes relevant to grain quality (Table 1), plus a list of the grades to which specific varieties are acceptable in the 2002/3 harvest (Table 2.). Refer to the earlier report for an explanation of the genes described in this up-dated version.

The recently released varieties included in this report are listed below. We acknowledge the provision of this information by the Cereal Chemistry Division of the Royal Australian Chemical Institute. The one-page summaries are taken from the annual report (September, 2002) by R.M.Williams and R.L.Cracknell (AWB Ltd) to the Cereal Chemistry Division of the Royal Australian Chemical Institute, in their role as Convenors of its Cereal Varieties Subcommittee. The information has been compiled from quality results provided by the relevant breeding programs, together with results supplied by the domestic flour milling industry, Agrifood Technology and the National Wheat Quality Evaluation Program. The assistance of all of these organisations is gratefully acknowledged.

Varieties included as one-page summaries:-

ANNUELLO (VL709)

EGA BONNIE ROCK (WAWHT2281, W4901157 & 90z2310-5-23)

HARRISMITH (WAWHT2182)

HUME (QT8750)

MACKELLAR (LH64C)

MAROMBI (SUN360I)

RUBRIC (H5170)

STYLET (RAC892)

WYALKATCHEM (WAWHT2212)

Table 1. Quality-related attributes and genes in Australian wheat varieties

Variety	Hardness	HMW alleles	LMW alleles	Wx-B1	PPO
Ajana	Soft	bia	bhb	a	M
Amery	Hard	bic	bbb	a	L
Anlace	Soft	aca	cgc	b	
Arnhem	Hard	aia	bdb	b	
Arrino	Soft	bia	c b b,c	b	M
Arrivato	Durum				
Babbler	Hard	aia	bbc		M
Banks	Hard	bba	bbc	a	L
Barunga	Hard	abd	cbc	b	
Batavia	Hard	aba	cbc	b	L
Baxter	Hard	afa	bha	a	M
Beulah	Hard	bba	cbb		
Blade	Hard	bia	bbb	b	M
Bowerbird	Hard				
Bowie	Soft	aca	b,c b c	b	
Braewood	Hard	aba	cbb		
Brennan	Feed			a	
Brookton	Hard	bia	cha	a	H
BT Schomburgk	Hard	a b,c a,d	cbc	b	M
Buckley	Soft	aca	cbc		
Calingiri	Soft	bfa	dda		
Camm	Hard	acd	bhc	b	M
Carnamah	Hard	bca	cdc	b	M
Cadoux	Soft	bia	bba	b	M
Cascades	Hard	ac a,d	cba	b	L
Chara	Hard	bba	bbb	a+b	
Chough	Soft	bba	bbb	b	
Clearfield JNZ	Hard	aba	bbb		
Clearfield STL	Hard	acd	egb		
Cocamba	Hard	bba	bbb	a	M
Condor	Hard	b,c ba	b,c bb	a	M
Corrigin	Soft	bba	bga	a	M
Cunderdin	Hard	bia	cda	a	M
Cunningham	Hard	aba	cbb	a	M
Currawong	Hard	aca	cbb		
Darter	Hard	bia	dbb		
Datatine	Soft	bba	fba	a	L
Dennis	Feed				
Diamondbird	Hard	aid	bhb	b	
Dollarbird	Hard	aid	bhb	a	M
Drysdale	Hard				
Eradu	Soft	aia	cbb		
Excalibur	Hard	b,a b,i a	c,b b a		

Variety	Hardness	HMW alleles	LMW alleles	Wx-B1	PPO
Frame	Hard	abd	chc	b	M
Goroke	Hard	cba	bbb		
Giles	Hard	aia	bbc	a	?L
Glover	Hard				
Goldmark	Hard	aia	chb	a+b	M?
H45 (Galaxy)	Hard	aba	chb	a	
Gunderoi	Durum				
Halberd	Hard	a c,e d	ecc	b	
Hartog	Hard	aid	bhb	b	H
Hybrid Apollo	Hard	bbd	c b,g b	a	
Hybrid Gemini	Hard	caa	cgb	a	
Hybrid Mercury	Hard	bdd	ebc	a	
Hybrid Meteor	Hard	a,b b,i a,b	b,e bb		
Hybrid Pulsar	Hard			a	
Janz	Hard	aba	bbb	a	M
Kalannie	Hard	b c d,a	b,c b c,b	b	M
Kamilaroi	Durum	ce-	??		
Karlgarin	Hard	acd	chc		
Kennedy	Hard	aid	bhb	b	H
Krichauff	Hard	acd	cba	b	L
Kukri	Hard	abd	dhb		
Lang	Hard	abd	cbb		L
Leichhardt	Hard	aid	ehb	b	H
Lorikeet	Soft	bba	bbc		
Machete	Hard	bia	bbb	b	M
Mawson	Feed/Hay	acd	ejb	a	
Meering	Hard	bba	bbb	a	M
Mira	Hard	bba	bbb	b	
Mitre	Hard	bba	cbb	a	
Mulgara	Hard	abd	bbb		
Nyabing	Hard	a,b ed	d b,h b,c	b	M
Ouyen	Hard	bba	cbb	a	M
Pardalote	Hard	abd	cbc		
Pelsart	Hard	aba	cbb	a	M
Perenjori	Hard	bic	dba	b	H
Petrie	Hard	abd	bbc		?L
Rosella	Soft	bba	bbb	b	M
Rowan	Hard	aid	chb	b	H
Rudd	Feed				
Silverstar	Hard	a b,i a,d	b,c hb	b	M?
Snipe	Soft	cba	cbb	a	
Stiletto	Hard	acd	chc		
Stretton	Hard	bia	cbc		
Strzelecki	Hard	aba	cbc		

Variety	Hardness	HMW alleles	LMW alleles	Wx-B1	PPO
Sunbri	Hard	aba	bbb	a	M
Sunbrook	Hard	aid	b,d h b	b	H
Sunco	Hard	aba	bbb	a	L
Sunland	Hard	aba	cbb	a	M
Sunlin	Hard	bia	dbb	b	M
Sunmist	Hard	aia	bbb	a	M-H
Sunsoft 98	Soft	bba	bbb	b	
Sunstate	Hard	aid	bhb	b	H
Sunvale	Hard	aba	bbb	a	H
Swift	Hard	bba	bbb		
Tailorbird	Hard	aid	bhb	b	
Tamaroi	Durum	cd			L
Tasman	Hard	bbd	bda		
Tatiara	Soft	aca	cbc	b	M
Tennant	Feed			a	
Thornbill	Soft	cba	c,b b a		
Tincurrin	Soft	bba	fda		
Trident	Hard	acd	ehc		
Triller	Soft	b,c ba	bjb	a	
Vectis	Soft	aba	cba		
Warbler	Feed	bba	bjb		
Wellstead	Soft	bia	cbc		
Westonia	Hard	bia	chc	b	M
Whistler	Hard	bba	cbb	a	
Wilgoyne	Hard	bid	dhb	a	H
Wollaroi	Durum	cb			
Worrakata	Hard	acd	cbc	b	L
Wylah	Hard	bba	cbb		
Wyuna	Soft	bia	chc	a	
Yallaroi	Durum	cf-			
Yanac	Hard	bea	bbb	b	
Yitpi	Hard	abd	chc		

Table 2. Grade acceptances of varieties for the 2002/3 harvest[1]

Variety	Queensland	Northern NSW	Southern NSW	Victoria	South Australia	Western Australia
Aroona					Accept APW	
Arrino						Prefer ASWN
Banks				Preferred AH		
Barunga					Preferred AH	
Batavia	Accept APH Pref domestic		Accept APH			
Baxter	Pref APH Not domestic	Pref APH Not domestic				
Brookton						Accept APW
BT Schomburgk		AH-SA			Marginal AH	
Cadoux						Pref ASWN
Calingiri						Accept ASWN
Camm				Accept APW	Accept APW	Accept APW
Carnamah						Marginal AH
Cascades						Marginal AH Accept APWT
Condor				Accept AH		
Cunderdin						Pref APW
Cunningham	Marginal APH	Marginal APH Pref domestic	Marginal APH Pref domestic			
Diamondbird		Accept AH Not domestic	Accept AH Not domestic	Accept AH Not domestic		
Dollarbird			Accept AH Not domestic			
Eradu						Pref ASWN
Excalibur					MarginalASW Not domestic	
Frame				Accept APW	Accept APW	
Giles	Pref APH Not domestic					
Goldmark				Accept AH		
Goroke				Pref APW		
H45			Marginal AH Not domestic	Accept APW		
Halberd				Accept APW	Accept APW	Accept APW into APWT
Hartog	Marginal APH					
Janz	Accept APH	Accept APH Pref domestic	Accept APH Pref domestic	Pref AH	Pref AH	
Kamilaroi		Accept durum				
Kellalac				Accept APW		
Kennedy	Accept APH Pref domestic	Accept APH Not domestic				
Krichauff					MarginalAPW	

Variety	Queensland	Northern NSW	Southern NSW	Victoria	South Australia	Western Australia
Lang	Pref APH Pref domestic					
Leichhardt	Accept AH					
Machete					Accept AH Pref domestic	Accept AH
Meering				Accept AH Pref domestic		
Ouyen				Accept AH Pref domestic		
Perenjori						Pref APW
Rosella			Pref soft ASWN Pref domestic	Pref soft ASWN Pref domestic		
Silverstar				Accept AH Pref domestic	Accept AH	
Stiletto					Accept APW	
Spear					Accept APW	Accept APW
Sunbri	Pref APH Not domestic	Pref APH Not domestic	Pref APH			
Sunbrook	Marginal APH	Marginal APH Not domestic	Marginal APH Not domestic			
Sunco	Pref APH Pref domestic	Pref APH	Pref APH			
Sunlin	Accept APH Not domestic	Accept APH Not domestic				
Sunmist		Marginal APH Not domestic				
Sunstate	Marginal APH Not domestic	Marginal APH Pref domestic				
Sunvale	Pref APH Pref domestic	Pref APH Not domestic	Pref APH Not domestic			
Tamaroi					Accept durum	
Trident					Accept ASW	
Vulcan			Marginal AH			
Westonia					Pref APW	Pref APW for APWT
Whistler			MarginalASW			
Wollaroi		Accept durum Pref domestic				
Wylah			Pref AH			
Yallaroi		Accept durum Pref domestic				

[1] From **"Preferred Wheat Varieties"**, a leaflet published by AWB Ltd, Melbourne. This listing should serve as a general guide to variety preferences, but further advice should be obtained before making decisions e.g. about sowing or buying. Grade acceptability depends on other factors too, such as protein content.
Abbreviations: Accept = Acceptable. Pref = Preferable. APH = Australian Prime Hard. AH = Australian Hard. APW = Australian Premium Wheat. ASWN = Noodle grade.

The following recently released varieties are listed as "yet to be established", but likely grades are indicated:
Babbler (APH), Bowerbird (AH), Braewood (AH), Chara (APH), Clearfield JNZ (AH), Clearfield STL (APW), Drysdale (AH), Harrismith (Soft), Glover (AH), Kennedy (APH), Kukri (AH), Lorikeet (Noodle), Mira (APW), Mitre (APW), Mulgara (APW), Pardalote (APW), Petrie (APW), Rudd (Feed), Strzelecki (APH), Thornbill (Soft), Wyalkatchem (APW), Yitpi (AH).

Table 2b. Grade acceptances of varieties for the 2003/4 harvest[1]

Variety	Queensland	Northern NSW	Southern NSW	Victoria	South Australia	Western Australia
Arrino*						Prefer ASWN
Barunga					Preferred AH	
Batavia	Accept APH Pref domestic		Accept APH			
Baxter*	Pref APH	Pref APH				
Brookton*						Accept APW
Cadoux						Pref ASWN
Calingiri*						Accept ASWN
Camm*				Accept APW Pref domestic	Accept APW	Accept APW
Carnamah*					Accept APW	Marginal AH
Cascades*						Marginal AH
Chara*			Pref APH			
Condor				Older accept AH		
Cunningham	Marginal APH	Marginal APH Pref domestic	Marginal APH Pref domestic			
Datatine*						Pref Soft
Diamondbird		Accept AH	Accept AH	Accept AH		
Dollarbird			Accept AH			
Eradu						Pref ASWN
Excalibur					MarginalASW	
Frame				Accept APW	Accept APW	
Giles*	Pref APH					
Goldmark*				Accept AH		
Goroke				Pref APW		
H45*			Marginal AH	MarginalAPW	MarginalAPW	MarginalAPW
Halberd					Older accept APW	Older accept APW
Hartog	Older marginal APH		Older marginal APH			
Hybrid Mercury		Accept APH				
Janz	Accept APH	Accept APH Pref domestic	Accept APH Pref domestic	Pref AH	Pref AH	
Kellalac				Older accept APW		
Kennedy*	Accept APH	Accept APH				
Krichauff					MarginalASW	

Table 2b. Grade acceptances of varieties for the 2003/4 harvest[1] (continued)

Variety	Queensland	Northern NSW	Southern NSW	Victoria	South Australia	Western Australia
Machete					Older accept AH	Older accept AH
Meering				Older accept AH Pref domestic		
Ouyen				Older accept AH Pref domestic		
Rosella				Pref soft ASWN Pref domestic		
Silverstar*				Accept AH Pref domestic		
Spear					Older accept APW	Older accept APW
Stiletto						Accept APW
Strzelecki*	Marginal APH					
Sunbri	Pref APH	Pref APH	Pref APH			
Sunbrook*	Marginal APH	Marginal APH	Marginal APH			
Sunco	Pref APH Pref domestic	Pref APH	Pref APH			
Sunlin	Accept APH	Accept APH				
Sunmist		Marginal APH				
Sunstate*	Marginal APH	Marginal APH Pref domestic				
Sunvale*	Pref APH Pref domestic	Pref APH	Pref APH			
Tamaroi*					Accept durum	
Trident					Accept ASW	
Westonia*					Pref APW	Pref APW
Whistler			MarginalASW			
Wollaroi*		Accept durum Pref domestic				
Wylah*			Pref AH			
Yallaroi	Accept durum	Accept durum Pref domestic				
Yitpi*				Pref AH Pref domestic	Pref AH Pref domestic	

[1] From **"Preferred Wheat Varieties: Season 2003 - 2004"**, a leaflet published by AWB Ltd, Melbourne. This listing should serve as a general guide to variety preferences, but further advice should be obtained before making decisions e.g. about sowing or buying. Grade acceptability depends on other factors too, such as protein content.

* Variety accepted under Plant Breeders Rights in Australia (in the table above and in the new varieties below).

Abbreviations: Accept = Acceptable. Pref = Preferable. APH = Australian Prime Hard. AH = Australian Hard. APW = Australian Premium Wheat. ASWN = Noodle grade.

The following recently released varieties are listed as "yet to become established", but likely grades are indicated:

Annuello* (AH), Babbler* (APH, preferred by domestic millers in SNSW), Bowerbird* (AH), Clearfield JNZ* (AH), Clearfield STL* (APW), Drysdale* (AH), EGA Bonnie Rock (AH), Glover* (AH), Harrismith* (Soft), Hume (APH), Kukri* (Special high-protein hard, AH in SA), Lorikeet* (ASWN), Mackellar* (Feed), Marombi (Feed), Mira* (APW), Mitre* (AH), Mulgara* (AH), Pardalote (APW), Petrie* (APH), Rubric* (Feed), Thornbill* (Soft), Wyalkatchem* (APW).

ANNUELLO *(VL709)*

Pedigree	Pavon'S'/TM56//Janz
Bred & Selected by	P. Martin, T. O'Connor, R. Eastwood, J. Panozzo & the wheat breeding team at VIDA
Released by	Department of Natural Resources and Environment in October 2001

Quality Characteristics

A hard-grained white wheat, Annuello has similar grain size and test weight to the traditional hard variety Meering. Its milling performance is good, producing white flour with better than average starch pasting quality. Despite the dough properties of Annuello being strong and balanced, its dough development time is not dissimilar to that of Meering, with a higher water absorption level.

In end-product assessment, Annuello produced yellow alkaline noodles that were yellow with acceptable brightness and stability. Its bread performance was acceptable, favouring the rapid method used extensively throughout Australia.

With its acceptable physical attributes and milling performance, good dough strength and rapid bread making quality, Annuello has been initially classified Australian Hard in Victoria, and likely to be highly sought by the domestic flour milling industry.

Variety	Test Weight	1000 Kernel Weight	Wheat Protein	PSI	Extract. Rate	Flour Ash	Colour Grade	Minolta		Amylo Peak	Farinograph			Extensograph (45min)		
								Flour			Water Abs.	DDT	Stab.	Extens.	Max. Height	Area
	(kg/hl)	(g)	(Nx5.7 11%mb)		(%)	(%14% mb)	(KJ)	L	b	(BU)	(%)	(min)	(min)	(cm)	(BU)	(cm^2)
Meering	81.0	31.6	11.6	18	77.8	0.50	-2.8	92.5	8.7	430	59.2	3.5	5.0	21.3	230	73
Mitre	80.0	30.7	11.6	16	76.6	0.46	-2.2	92.9	10.4	400	60.4	4.1	4.0	22.5	275	92
Annuello	**81.5**	**31.7**	**12.0**	**16**	**77.2**	**0.51**	**-2.0**	**93.1**	**8.0**	**640**	**61.1**	**4.3**	**5.5**	**21.7**	**300**	**96**
Samples from VIDA 1999/00 Hard Series, quality results from Agrifood Technology																

End Products	Pan Bread Rapid		Pan Bread Fermented		Noodles Yellow Alkaline			
Variety	Average Volume (cc)	Total Score (100)	Average Volume (cc)	Total Score (100)	Sensory Score %	Minolta L (1/2hr)	Minolta b (1/2hrs)	△ Minolta L (24hrs)
Meering	828	62.5	795	64.7	61.4	78.6	27.3	9.5
Annuello	**795**	**65.6**	**768**	**57.7**	**64.1**	**79.4**	**27.2**	**8.6**
Source VIDA Samples from 1999/00 quality results from BRI Australia through NWQEP testing								

EGA BONNIE ROCK *(WAWHT2281, W4901157 & 90z2310-5-23)*

Pedigree	Sr9e.3*Warigal..3*Aroona (83Z:1048)/(82W:1097) 3Ag3.4*Condor..3*Millewa.3.Bodallin
Bred & Selected by	R. Wilson & WA wheat breeding team
Released by	Department of Agriculture Western Australia in August 2002

Quality Characteristics

EGA Bonnie Rock is an excellent all-round hard grained variety. It has good physical properties, with large kernel size and high test-weight levels. Long-term data would suggest that for a hard variety, it is slightly soft and this results in lower than ideal water absorption levels, but this does not affect its baking or noodle making quality. In fact, its yellow alkaline noodle quality was very good when compared to existing control varieties. This variety has high flour extraction potential with the resultant flour being bright and white. EGA Bonnie Rock has balanced dough properties, and has the added quality advantage of high starch pasting levels.

As a consequence, EGA Bonnie Rock has been awarded an initial classification of Australian Hard in Western Australia.

Variety	Test Weight	1000 Kernel Weight	Wheat Protein	PSI	Extract. Rate	Flour Ash	Colour Grade	Minolta		Amylo Peak	Farinograph			Extensograph (45min)		
								Flour			Water Abs.	DDT	Stab.	Extens.	Max. Height	Area
	(kg/hl)	(g)	(Nx5.7 11%mb)		(%)	(%14%mb)	(KJ)	L	b	(BU)	(%)	(min)	(min)	(cm)	(BU)	(cm^2)
Cascades	81.5	34.5	11.9	13	77.3	0.43	-2.5	92.7	12.3	780	59.4	4.9	8	19.7	400	106
Machete	80.0	33.3	11.6	13	74.6	0.50	-2.5	93.0	9.7	850	63.8	4.2	6.9	19.1	370	99
Amery	80.5	33.4	10.6	12	74.3	0.47	-2.7	93.0	9.3	570	63.3	4.2	11.7	17.8	450	110
Kalannie	81.0	32.1	11.1	13	74.9	0.49	-3	93.3	8.4	600	61.1	4.5	10	19.2	425	112
EGA Bonnie Rock	**82.5**	**11.7**	**1.13**	**13**	**75.8**	**0.4**	**-3.6**	**93.2**	**9.7**	**890**	**61.3**	**4.2**	**8.4**	**21.1**	**455**	**130**
Samples from Department of Agriculture WA 2000/01 Hard High Protein Trials, quality results from Agrifood Technology																

End Products	Pan Bread Rapid		Pan Bread Fermented		Noodles Yellow Alkaline			
Variety	Average Volume (cc)	Total Score (100)	Average Volume (cc)	Total Score (100)	Sensory Score %	Minolta L (1/2hr)	Minolta b (1/2hrs)	△ Minolta L (24hrs)
Cascades	898	71	848	62	64.3	78.9	31.6	8.9
Machete	850	68	793	63	64.7	79.5	26.8	9.5
Amery	825	62	803	65	72.1	82.8	25.5	6.1
Spear	850	68	820	61	67.2	80.7	29.5	9.0
EGA Bonnie Rock	**880**	**72**	**878**	**73**	**68.2**	**81.1**	**27.9**	**6.1**
Samples from Department of Agriculture WA 2000/01 Hard High Protein Trials, quality results from BRI Australia through NWQEP testing								

HARRISMITH *(WAWHT2182)*

Pedigree	Corrigin/Agent3C.2*Lance..3*Tincurrin
Bred & Selected by	R. McLean & R. Wilson, plus WA wheat breeding team & National Rust Control Program
Released by	Department of Agriculture Western Australia in August 2001

Quality Characteristics

Harrismith is a bearded, club head wheat with superior test weight and grain size compared to existing varieties such as Corrigin, Tincurrin and Datatine. In addition, it is appears to have slightly larger grain, and less propensity to high screenings than these varieties.

It is not quite as soft, but its milling performance is comparable to other Australian club wheats. The flour of Harrismith is bright and of an acceptable colour. The water absorption of Harrismith is slightly high for a soft-grained wheat, and this can be attributed to its hardness and generally higher protein level. However this higher protein level does not affect its extensibility or dough strength, both of which are similar to other soft wheats.

Whilst its biscuit performance is acceptable, some checking is sometimes present. In steamed bread tests, Harrismith performed better than other soft wheats.

With its improved grain size and similar dough properties to existing varieties, Harrismith has been a welcome addition to the Australian Soft class in Western Australia.

Variety	Test Weight	1000 Kernel Weight	Wheat Protein	PSI	Extract. Rate	Flour Ash	Colour Grade	Minolta		RVA Peak	Farinograph		Extensograph (45min)	
								Flour			Water Abs.	DDT	Extens.	Max. Height
	(kg/hl)	(g)	(Nx5.7 11%mb)		(%)	(%14%mb)	(KJ)	L	b	(RVU)	(%)	(min)	(cm)	(BU)
Tincurrin	80.4	32.9	8.3	30	72.2	NA	NA	92.5	8.9	NA	50.6	1.6	16.8	161
Harrismith	82.6	33.8	8.8	26	72.5	NA	NA	92.4	9.0	NA	53.4	1.6	17.0	156
Samples & average quality results from WA Department of Agriculture trials 1996/97 through to 2000/01														
Tincurrin	81.0	31.0	8.6	28	76.6	0.49	-2.3	93.3	10.1	278	51.2	2.1	20.2	175
Corrigin	81.5	31.2	8.8	27	77.8	0.54	-1.9	93.1	9.9	286	52.9	1.5	20.2	160
Harrismith	83.8	34.7	9.1	22	76.8	0.49	-1.8	93.1	9.7	272	55.1	1.7	18.8	155
Samples from Department of Agriculture WA 1999/00 trials, quality results from BRI Australia through NWQEP														

End Products	Biscuits			Steamed Bread Guandong
Variety	Height Increase (mm)	Spread (mm)	Checking (%)	Total Score %
Tincurrin	4.3	2.4	0	54.9
Corrigin	3.7	1.6	0	59.6
Harrismith	**3.2**	**2.8**	**40**	**63.2**
Department of Agriculture WA Samples from 1999/00 trials, quality results from BRI Australia through NWQEP testing				

HUME *(QT8750)*

Pedigree	Doubled haploid wheat derived from the backcross 1 F1 Pelsart/2*Batavia
Bred & Selected by	P. Banks and J. Sheppard and wheat breeding team at the Leslie Research Institute
Released by	Queensland Department of Primary Industries in September 2002

Quality Characteristics

This variety was designed to combine the noodle making quality of Batavia and dough strength and milling quality of Pelsart, together with black point and disease attributes, although the latter have been varied. The result is acceptable milling quality with satisfactory flour colour. Water absorption levels are good, with development times and stability suggesting it is marginally weaker than Sunco and Hartog, which is confirmed by tests showing balanced, but not overly strong dough properties. Of particular interest is the fact that Hume has higher starch pasting quality, when compared to most existing Australian Prime Hard varieties.

Hume performed well in all baking tests, producing excellent results in rapid bake tests making it well suited to Australia's high-throughput bakeries. In yellow alkaline noodle assessment Hume exhibited good colour stability with bright and yellow noodles of acceptable texture.

As a consequence of this good all-round end product performance, and despite less than ideal dough strength, Hume has been given an initial classification of Australian Prime Hard for Queensland.

Variety	Test Weight	1000 Kernel Weight	Wheat Protein	PSI	Extract. Rate	Flour Ash	Colour Grade	Minolta		Amylo Peak	Farinograph			Extensograph (45min)		
								Flour			Water Abs.	DDT	Stab.	Extens.	Max. Height	Area
	(kg/hl)	(g)	(Nx5.7 11%mb)		(%)	(%14%mb)	(KJ)	L	b	(BU)	(%)	(min)	(min)	(cm)	(BU)	(cm^2)
Banks	81.0	31.7	13.7	14	77.6	0.48	-2.8	92.8	9.4	400	63.5	5.2	8.5	22.3	320	101
Hartog	81.0	34.3	13.2	11	76.9	0.43	-2.1	92.0	10.5	710	63.0	6.2	>15.0	21.3	460	137
Cunningham	82.0	32.3	14.5	16	76.7	0.47	-2.8	92.2	8.7	420	63.3	6.4	12.0	25.0	385	134
Sunco	82.5	31.2	14.6	17	77.3	0.42	-3.0	92.4	9.0	520	63.9	7.2	>15.0	>26.0	415	>157
Hume	**80.5**	**32.8**	**13.7**	**13**	**76.9**	**0.48**	**-2.5**	**92.4**	**9.3**	**870**	**63.2**	**5.5**	**13.5**	**23.8**	**370**	**125**
Samples from Queensland Department of Primary Industries 2000/01 Main Series Trials, quality results from Agrifood Technology																

End Products	Pan Bread Rapid		Pan Bread Fermented		Pan Bread Sponge & Dough		Noodles Yellow Alkaline			
Variety	Average Volume (cc)	Total Score (100)	Average Volume (cc)	Total Score (100)	Average Volume (cc)	Total Score (100)	Sensory Score %	Minolta L (1/2hr)	Minolta b (1/2hrs)	△ Minolta L (24hrs)
Banks	940	76.3	833	64.9	1925	62	64.8	79.8	30.4	5.4
Hartog	935	78.8	825	65.4	1881	62	67.6	78.9	26.1	10.9
Cunningham	860	69.4	790	58.4	1925	65	63.3	77.8	28.1	9.2
Sunco	937	77.3	863	66.9	1950	66	71.1	80	29.3	5.7
Hume	**975**	**80.3**	**865**	**65**	**2067**	**73**	**66.8**	**79.9**	**28.7**	**5.6**
Samples from Queensland Department of Primary Industries 2000/01 Main Series Trials, quality results from BRI Australia through NWQEP testing										

MACKELLAR *(LH64C)*

Pedigree	Tatiara/TC14//Beaver/3/Soisson/4/B1073
Bred & Selected by	J. Davidson, S. Kleven & the winter wheat team
Released by	CSIRO in August 2002

Quality Characteristics

Mackellar is a late maturing, red-grained winter wheat, that can be grazed. It is awnless, white chaffed, short medium height with strong straw strength. It is the first winter wheat to be released with resistance to Barley Yellow Dwarf Virus.

It is the highest yielding dual-purpose winter wheat released by CSIRO. Mackellar has been shown to be between 10-15% higher yielding than varieties such as Dennis, Rudd and Currawong.

***MAROMBI** (SUN360I)*

Pedigree M2369/Sunlin
Bred & Selected by F.W. Ellison, J.N. Brown & B. Freebairn
Released by SunPrime Seeds Pty Ltd in November 2001

Quality Characteristics

Marombi has been released as a dual purpose grazing and feed wheat. It is hoped that with sufficient quality data it maybe acceptable as Australian Standard White. Positive features are its good flour water absorption and potentially acceptable rapid dough bread-making, although domestic baking assessment is not positive. From limited testing, quality concerns include small grain size and questionable test weight with average to poor milling performance, and yellower than ideal flour. Marombi's dough properties are very weak with varying extensibility. In noodle tests it performed poorly.

Consequently, Marombi retains its initial Feed wheat classification.

Variety	Test Weight	1000 Kernel Weight	Wheat Protein	PSI	Extract Rate	Flour Ash	Colour Grade	Minolta		RVA Peak	Farinograph			Extensograph (45min)	
								Flour			Water Abs.	DDT	Stab.	Extens.	Max. Height
	(kg/hl)	(g)	(Nx5.7 11%mb)		(%)	(%14%mb)	(KJ)	L	B	(RVU)	(%)	(min)	(min)	(cm)	(BU)
Sunbrook	80.3	31.6	13.8	11	79.1	0.47	0.7	90.2	10.9	330	60.6	6.7	6	24.7	380
Suneca	82.6	42.0	14.3	17	81.5	0.48	0.2	90.9	9.7	293	57.4	6.7	7.6	24.1	400
Whistler	77.0	30.9	14.3	11	77.3	0.55	0.5	90.3	11.1	288	62.9	5.5	8.1	22.5	265
Marombi	**77.9**	**30.4**	**14.7**	**14**	**77.6**	**0.61**	**1.2**	**90.2**	**11.8**	**330**	**62.3**	**6.7**	**8.6**	**25.4**	**210**
Samples from SunPrime Seeds Pty Ltd 2001/02 N.NSW trials, quality results from BRI Australia through NWQEP testing															

End Products	Pan bread Rapid		Pan bread Fermented		Pan bread Sponge & dough		Noodles Yellow Alkaline			
Variety	Average volume (cc)	Total score /100	Average volume (cc)	Total score /100	Average volume (cc)	Total Score /100	Sensory Score %	Minolta L (0.5h)	Minolta b (0.5h)	△ Minolta L (24h)
Sunbrook	928	77	803	65	1875	61	54.9	75.82	29.31	10.78
Suneca	795	59	778	58	1787	49	56.4	76.84	27.91	11.23
Whistler	735	58	735	58	1725	44	58.4	76.27	29.14	9.56
Marombi	**790**	**62**	**693**	**50**	**1613**	**37**	**52.6**	**77.5**	**33.1**	**10.3**
Samples from SunPrime Seeds Pty Ltd 2001/02 N.NSW trials, quality results from BRI Australia through NWQEP testing										

***RUBRIC** (H5170)*

Bred & Selected by	Crop and Food Research & Heritage Seeds (NZ)
Issued by	Crop and Food Research (NZ), AWB Limited & Heritage Seeds

Quality characteristics

Rubric is a hard-grained red wheat that has large, plump kernels. It has good milling qualities, being similar to Janz and Meering. The flour produced from Rubric is very white and bright. It has strong dough properties, coupled with acceptable dough extensibility. Its water absorption level is around the Meering level, and although acceptable, it is lower than desirable for a variety of this hardness. Baking quality is good, equivalent to Janz and Goldmark for both fermented and sponge and dough methods.

Rubric's white flour makes it suitable for a number of end products, particularly steamed bread.

It performed poorly in the production of yellow alkaline noodles, due to poor colour development and unacceptable stability.

As a red wheat, Rubric is not accepted into any of AWB Limited's standard milling wheat classes, and as such is classified as Feed.

Variety	Test Weight	1000 Kernel Weight	Wheat Protein	PSI	Extract Rate	Flour Ash	Colour Grade	Minolta		Amylo Peak	Farinograph			Extensograph (45min)		
								Flour			Water Abs.	DDT	Stab.	Extens.	Max. Height	Area
	(kg/hl)	(g)	(Nx5.7 11%mb)		(%)	(%14%mb)	(KJ)	L	b	(BU)	(%)	(min)	(min)	(cm)	(BU)	(cm^2)
Meering	81.0	30.4	13.0	16	76.6	0.53	-1.6	92.3	10.2	360	60.1	3.7	7.0	23.1	190	67
Janz	80.5	31.2	12.7	15	76.3	0.50	-1.3	92.4	9.2	370	62.2	4.3	6.5	21.8	235	76
Rubric	**82.5**	**35.6**	**13.0**	**15**	**77.8**	**0.59**	**-0.6**	**91.9**	**8.0**	**370**	**63.0**	**5.0**	**7.5**	**22.0**	**325**	**101**

Samples from Heritage Seeds 2000/01 Howlong Trial, Quality Results from Agrifood Technology

End Products	Pan Bread Fermented		Pan Bread Sponge & Dough		Steamed Bread		Noodles Yellow Alkaline				
Variety	Loaf Volume (cc)	Total Score	Loaf Volume (cc)	Total Score	Spread Ratio Score	Total Score	Minolta L (1/2hr) *	Minolta b (1/2hrs) *	Cooked Noodle Minolta L *	Cooked Noodle Minolta b *	△Minolta L (24hrs) *
Meering	795	82	1400	75	-	-	82.5	24.5	73	30.5	12.8
Janz	745	78	1350	74	22	67	83.9	22.7	72.6	30.6	10.8
Goldmark	-	-	-	-	-	-	83	24.5	72.3	31.5	11.8
Rubric	**750**	**79**	**1550**	**86**	**34**	**83**	**82.4**	**19.5**	**70.2**	**26.7**	**15.3**

Samples from Heritage Seeds 2000/01 Howlong & 1999/00 Minyip(YAN) Trials, Quality Results from Agrifood Technology*

***STYLET** (RAC892)*

Pedigree Molineux/2*Trident
Bred & Selected by Dr. G. Hollamby
Named by University of Adelaide - Roseworthy Wheat Breeding Program in 2001
Commercial release is pending further evaluation of disease susceptibility

Quality Characteristics

On the basis of SARDI quality results, Stylet has good grain size, slightly smaller than Frame. It has average milling performance, and its flour colour is a positive attribute, being comparable to Janz and Machete. An outstanding feature of this variety is its high water absorption level, which is on par with that of Machete. At Australian Premium White protein levels the extensibility of Stylet is similar to Frame, as are baking scores and volumes. In limited quality tests at slightly higher protein levels, undertaken through the National Wheat Quality Evaluation Program, its dough properties and bake test results were again very similar to Frame. Such a quality profile makes Stylet an ideal Australian Premium White quality variety, which is its initial classification for South Australia.

Variety	Test Weight	1000 Kernel Weight	PSI	Extract Rate	Flour Protein	Colour Grade	Minolta		RVA	Farinograph			Extensograph (45min)	
							Flour		Peak	Water Abs.	DDT	Stab.	Extens.	Max. Height
	(kg/hl)	(g)		(%)	(%)	(KJ)	L	b		(%)	(min)	(min)	(cm)	(BU)
Frame	82.1	38.0	13	74.9	9.7	-3.4	93.0	10.7	148	64.5	3.6	4.5	17.0	237
Janz	80.7	30.5	16	74.0	9.9	-3.1	93.0	9.1	128	61.9	4.0	5.6	18.9	282
Krichauff	80.2	31.8	16	74.3	9.8	-2.3	92.6	13.0	184	63.5	3.7	4.5	17.3	258
Stylet	**81.8**	**35.4**	**13**	**73.1**	**9.4**	**-3.4**	**93.0**	**9.7**	**138**	**65.9**	**4.2**	**5.4**	**17.4**	**296**
Samples & average quality results from SARDI 2000/01 trials														

End Products	Pan Bread Rapid		Pan Bread Fermented		Noodles Yellow Alkaline			
Variety	Average Volume (cc)	Total Score (100)	Average Volume (cc)	Total Score (100)	Sensory Score %	Minolta L (1/2hr)	Minolta b (1/2hrs)	△ Minolta L (24hrs)
Frame	880	72	783	62	62.9	79.4	28.8	9.7
Janz	808	66	803	60	64.7	80.2	25.3	10.2
Krichauff	880	71	808	62	67.2	80.2	31.5	6.2
Stylet	**905**	**75**	**730**	**55**	**65.3**	**80.0**	**28.8**	**9.0**
Samples from SARDI 2000/01 Trials, quality results from BRI Australia through NWQEP testing								

WYALKATCHEM *(WAWHT2212)*

Pedigree	Machete/Gutha..Jacip*2.11thISEPTON135
Bred & Selected by	R. Wilson & WA wheat breeding team
Released by	Department of Agriculture Western Australia in August 2001

Quality Characteristics

Wyalkatchem has large grain size, helping it to have slightly better extraction levels, although still behind Cascades, with flour that is considered creamy and not too yellow. It has average starch pasting quality based on tests such as the Amylograph, however flour swelling volume tests suggest that it is similar to other varieties like Cascades, Machete and Westonia. It has good flour water absorption levels, and farinograph results suggest good stability. Wyalkatchem has acceptable dough properties that are not strong.

In end product evaluations Wyalkatchem was middle of the road, being better suited to the rapid style bread making process. In bread making tests requiring more dough strength, it did not perform well, nor did it make particularly good yellow alkaline noodles that were dull but of acceptable colour.

Its good grain size and higher water absorption make Wyalkatchem a useful addition to the Australian Premium White class where it has been initially classified for Western Australia.

Variety	Test Weight	1000 Kernel Weight	Wheat Protein	PSI	Extract Rate	Flour Ash	Colour Grade	Minolta Flour		Amylo Peak	Farinograph			Extensograph (45min)		
											Water Abs.	DDT	Stab.	Extens.	Max. Height	Area
	(kg/hl)	(g)	(Nx5.7 11%mb)		(%)	(%14%mb)	(KJ)	L	B	(BU)	(%)	(min)	(min)	(cm)	(BU)	(cm^2)
Spear	82.0	35.8	11.3	16	76.3	0.45	-3.1	92.5	10.6	760	62.3	4	7	19	315	86
Cascades	82.0	37.1	11	16	77.1	0.38	-2.5	93	11.4	880	60.1	3.3	4.5	21.3	320	97
Machete	80.5	38.3	11.3	16	75.2	0.43	-2.5	92.9	9.0	900	64.9	4.4	6.5	19.7	395	109
Amery	80.0	38.9	10.3	12	75.0	0.43	-2.1	92.9	8.8	420	65.4	4.2	7	19.5	405	113
Janz	84.0	33.7	11.4	15	76.3	0.4	-3.4	93.3	8.6	540	61.3	4.5	7	19.8	440	123
Wyalkatchem	**84.0**	**40.0**	**11.7**	**15**	**76.2**	**0.4**	**-1.8**	**93.1**	**10.2**	**550**	**63.2**	**4.2**	**9.8**	**20.3**	**350**	**101**
Samples from Department of Agriculture WA 1999/00 Trials, quality results from Agrifood Technology																

End Products	Pan Bread Rapid		Pan Bread Fermented		Noodles Yellow Alkaline			
Variety	Average Volume (cc)	Total Score (100)	Average Volume (cc)	Total Score (100)	Sensory Score %	Minolta L (1/2hr)	Minolta b (1/2hrs)	Minolta L (24hrs)
Spear	880	67.1	790	61.5	66.2	80.3	30.7	9.1
Cascades	878	65.1	828	62.6	62.2	80.3	29	9.5
Machete	878	73	800	63.9	64	79	28.4	9.3
Amery	773	59.3	790	63.4	66.4	81.6	25.9	6.1
Wyalkatchem	**850**	**67**	**718**	**52.2**	**63.4**	**77.7**	**30**	**8.7**
Samples from Department of Agriculture WA 1999/00 Trials, quality results from BRI Australian through NWQEP testing								