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Expected Responses of Australian Wheat and Triticale Varieties to the Cereal Rust Diseases in 2012

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A national consultative process for determining rust responses for Australia wheat and triticale varieties was developed in 2004 for stripe rust. This has become an annual event with the intention to keep industry growers and technical advisors alert to expected rust responses across the range of Australian commercial varieties. In 2011 the annual review was expanded to include leaf and stem rust responses. The variety responses presented in this report are based on consultation using the most recent field trial reports and historical data sets, and developed in the context of prevailing rust pathotypes recorded in 2011.

The disease response categories are summarised in Table 1. The colour coding in this table has been used in the following tables to assist in highlighting strengths and potential weaknesses in varieties with respect to rust reaction.

The rust responses of current Australian bread wheat varieties, durum wheats and triticales are presented in Tables 3, 4 and 5 respectively. The presence of adult plant resistances *Sr2, Sr57, Lr34, Lr46, Yr18* and *Yr29* have been predicted on the basis of molecular markers, pedigree and associated agronomic features such as false black chaff and leaf tip necrosis.

Stripe rust response is represented in two columns: the 'WA' pathotype predominates in Western Australia, but has been displaced in the east by a range of pathotypes in recent years. The most virulent in the east is currently the 'Yr17-27' pathotype, although it remains at low frequency. However, the response to this pathotype among varieties carrying *Yr17, Yr27* or the combination of these genes will indicate the expected response to pathotypes which predominately carry virulence for *Yr17*.

Leaf rust pathotypes virulent for *Lr13, Lr24* and *Lr37* have been used to develop leaf rust responses. However, the leaf rust response of Wyalkatchem and its derivatives will be expected to change following the detection of a new leaf rust pathotype combining virulence for *Lr13, Lr17a* and *Lr20* (76-1,3,5,7,9,10,12+Lr37) in 2011. Field data for this pathotype is currently not available and will be generated during the 2012 filed testing cycle.

Stem rust resistance based on *Sr2* confers low to moderate levels of adult plant resistance under low disease pressure. The combination of *Sr36* with *Sr38* (Sunbri, Sunvale, Young) or with *Sr24* (Lang, Sunco) confer resistance to all known stem rust pathotypes. A majority of varieties carrying *Sr30* will be expected to show more rusting in the northern region in the presence of pathotypes virulent for *Sr30*.

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Table 1 Response descriptors for the rust diseases of wheat

	Description
R	highly resistant: occasional symptoms of infection including necrotic flecks; no sporulation
RMR	resistant: symptoms evident and usually with necrosis and chlorosis, limited sporulation, and affected leaf area up to 15%
MR	moderately resistant: evidence of sporulating areas on the leaf surface with some chlorosis and necrosis, and affected leaf area up to 30%
MRMS	intermediate: restricted sporulating areas with some chlorosis, and affected leaf area up to 50%
MS	moderately susceptible: freely sporulating lesions and affected leaf area up to 70%
MSS	moderately susceptible to susceptible: freely sporulating lesions with leaf area affected up to 90%
S	susceptible: abundant sporulation across the whole leaf surface; leaf area affected up to 100%; some chlorosis and necrosis evident
SVS	Susceptible to very susceptible: abundant sporulation across the leaf surface ; leaf area affected up to 100%; limited chlorosis
VS	highly susceptible: abundant sporulation across the whole leaf area with no evidence of chlorosis or necrosis; 100% leaf area affected

Table 2 Disease response and disease resistance genotypes of Australian bread wheat varieties to leaf, stem and stripe rust diseases

	Rust Response					Rust Resistance Genotype		
	Leaf Rust[A]		Stem Rust	Stripe Rust				
	Eastern States	WA		WA pt	Yr17-27 pt	Leaf Rust	Stem Rust	Stripe Rust
AGT Katana	MS	MR	MSS	MRMS	MRMS	*Lr1, Lr13*	*Sr8a, Sr30*	
Amarok	R	R	S	R	MRMS	*Lr14a, Lr37*	*Sr38*	*Yr17*
Annuello	RMR	RMR	RMR	MSS	MSS	*Lr24, Lr34, Lr46*	*Sr24, Sr57*	*Yr18, Yr29*
Arrino	MS	MS	SVS	S	S		*Sr30*[C]	
Axe	MR	MR	MRMS	RMR	RMR		*Sr8b*	
Babbler	MS	R	RMR	MSS	MSS	*Lr24, Lr34*	*Sr24, Sr57*	*Yr18*
Barham	MRMS	MRMS	MRMS	RMR	MSS	*Lr1, Lr20, Lr34, Lr37*	*Sr9b,Sr15, Sr38*	*Yr17, Yr18*
Baxter	MR	R	R, MS[C]	MSS	MSS	*Lr17a, Lr34*	*Sr2, Sr30, Sr36*[C]*, Sr57*	*Yr18*
Beaufort	R	R	SVS	R	RMR	*Lr13, Lr37*	*Sr38*	*Yr17*
Binnu	MRMS	MRMS	S	R	MS	*Lr37*	*Sr38*	*Yr17*
Bolac	MS	MR	MR	RMR	RMR	*Lr34*	*Sr30, Sr57*	*Yr4, Yr18*
Bowerbird	R	R	MS	S	S	*Lr1, Lr13*	*Sr2, Sr30*	
Bowie	MS	MS	S	RMR	S	*Lr37*	*Sr15, Sr38*	*Yr17*
Braewood	R	R	MR	R	MRMS	*Lr13, Lr34, Lr37*	*Sr2, Sr30, Sr38, Sr57*	*Yr17, Yr18*
Bullaring	MS	R	RMR	MRMS	MRMS[C, D]	*Lr24*	*Sr24*	
Bumper	R	R	MSS	MS	MS	*Lr1, Lr13, Lr34*	*Sr30,Sr57*	*Yr18*
Calingiri	MS	MS	S	S	S		*Sr30*	
Carinya	MRMS	R	RMR	R	MRMS	*Lr24, Lr34, Lr37*	*Sr24, Sr38, Sr57*	*Yr17, Yr18*
Carnamah	MS	MSS	MRMS	S	S	*Lr27+Lr31*	*Sr2, Sr30*	
Catalina	R	R	RMR	MS	MS	*Lr24, Lr34*	*Sr24, Sr57*	*Yr18*
Chara	MS	R	MRMS	MSS	MSS	*Lr13, Lr34*	*Sr30, Sr57*	*Yr18*
Clearfield JNZ	MRMS	R	MR	MSS	MSS	*Lr24, Lr34*	*Sr24, Sr57*	*Yr18*

	Rust Response					Rust Resistance Genotype		
	Leaf Rust[A]		Stem Rust	Stripe Rust		Leaf Rust	Stem Rust	Stripe Rust
	Eastern States	WA		WA pt	Yr17-27 pt			
Clearfield STL	SVS	SVS	MRMS	S	S		*Sr13*	
Cobra	MR	MR	RMR	S	S	*Lr3a, Lr27+Lr31*	*Sr2, Sr8a,Sr30*	
Corack	MSS	RMR	MR	MS	MS	*Lr3a, Lr13*	*Sr2, Sr30*	
Correll	MSS	MSS	MR	MRMS	MRMS		*Sr30*	
Crusader	R	R	RMR	R	MS	*Lr1, Lr13, Lr34, Lr37*	*Sr2, Sr30, Sr38, Sr57*	*Yr17, Yr18*
Cunningham	MRMS	R	RMR	MS	MS	*Lr24, Lr34*	*Sr24, Sr57*	*Yr18*
Currawong	RMR	RMR	RMR	MRMS	MRMS	*Lr34*	*Sr26, Sr57*	*Yr18*
Dakota	MRMS	MRMS	MR	MRMS [D]	MRMS [D]	*Lr34*	*Sr57*	*Yr18*
Derrimut	R	R	MR	R	MSS	*Lr13, Lr34, Lr37*	*Sr2, Sr30, Sr38, Sr57*	*Yr17, Yr18*
Diamondbird	R	R	MRMS	MS	MS	*Lr1, Lr13, Lr46*	*Sr2*	*Yr29*
Drysdale	MS	MS	MR	MS	MS	*Lr46*	*Sr2, Sr30*	*Yr29*
EGA Bonnie Rock	RMR	MR	MS	VS	VS	*Lr13*	*Sr30*	
EGA Bounty	R	R	MR	MR	MR	*Lr1, Lr13*	*Sr2, Sr30*	
EGA Burke	R	R	MR	MS	MS	*Lr1, Lr13, Lr34*	*Sr2, Sr30, Sr57*	*Yr18*
EGA Eaglehawk	R	R	RMR	R	MRMS	*Lr1, Lr13, Lr37*	*Sr2, Sr30, Sr38*	*Yr17*
EGA Gregory	RMR	RMR	MR	MR [C, D]	MR [C, D]	*Lr13, Lr23, Lr34*	*Sr30, Sr57*	*Yr18, Yr33*
EGA Hume	R	R	MR	MRMS	MRMS	*Lr13, Lr23, Lr34*	*Sr30, Sr57*	*Yr18*
EGA Kidman	R	R	MR	MRMS [D]	MRMS [D]	*Lr13, Lr23, Lr34*	*Sr2, Sr30, Sr57*	*Yr18*
EGA Stampede	R	R	RMR	MR	MR	*Lr13, Lr34*	*Sr2, Sr30, Sr57*	*Yr18*
EGA Wedgetail	MS	MS	MRMS	MRMS [D]	MRMS [D]	*Lr34*	*Sr30, Sr57*	*Yr18*
EGA Wentworth	MR	MR	RMR	MS	MS	*Lr24, Lr34*	*Sr2, Sr24, Sr57*	*Yr18*
EGA Wills	R	R	RMR	MRMS [D]	MRMS [D]	*Lr13, Lr24, Lr34*	*Sr2, Sr24, Sr57*	*Yr18*
EGA Wylie	R	R	R	MS	MS	*Lr17a, Lr34*	*Sr2, Sr30, Sr36, Sr57*	*Yr18*
EGA2248	MRMS	MRMS	MRMS	MSS	MSS			
Ellison	R	R	MR	R	MS	*Lr3a, Lr13, Lr37*	*Sr2, Sr30, Sr38*	*Yr17*
Elmore CL Plus	RMR	RMR	RMR	MRMS	MRMS	*Lr24, Lr34*	*Sr24, Sr57*	*Yr18*
Emu Rock	S	R	MRMS	MRMS	MRMS	*Lr13*	*Sr2, Sr8a, Sr30*	
Endure	MRMS	RMR	MR	RMR	SVS	*Lr1, Lr3a, Lr37*	*Sr12 or Sr17, Sr38*	*Yr17*
Envoy	R	R	MRMS	R	SVS	*Lr37*	*Sr38*	*Yr17*
Espada	R	R	R	R	MRMS	*Lr24, Lr37*	*Sr24, Sr38*	*Yr17*
Estoc	MRMS	MRMS	RMR	MRMS	MRMS			
Fang	R	MR	R-MS [E]	R	MSS	*Lr34, Lr37*	*Sr38, Sr57*	*Yr17, Yr18*
Forrest	MRMS	MR	R	RMR	RMR	*Lr1, Lr13, Lr34*	*Sr8a, Sr12, Sr30, Sr57*	*Yr18*
Fortune	MRMS	MR	MS	MS	MS	*Lr17a*	*Sr30*	
Frame	MS	MSS	MS	MS	MS		*Sr30*	
Frelon	R	R	SVS	R	R	*Lr37*	*Sr38*	*Yr17+*
Gauntlet	MR	MR	RMR	RMR	MRMS	*Lr3a, Lr37*	*Sr8a, Sr38*	*Yr17*
GBA Hunter	MS [C]	MS [C]	RMR	RMR	MRMS [D]	*Lr26, Lr34*	*Sr31, Sr57*	*Yr9, Yr18, Yr27*
GBA Ruby	MRMS	MR	MS	RMR	MSS		*Sr30*	*Yr27*
GBA Sapphire	MRMS	R	RMR	MS	MS	*Lr24, Lr34*	*Sr24, Sr57*	*Yr18*
Giles	R	R	RMR	MS	MS	*Lr13, Lr24, Lr34*	*Sr24*	*Yr18*
Gladius	MS	MS	MR	R	MRMS [D]	*Lr37*	*Sr38*	*Yr17*
Guardian	MRMS	R	RMR	MS	MS	*Lr24*	*Sr24*	
H45	R	R	MS	VS	VS	*Lr13*	*Sr30, Sr57*	
H46	R	R	MRMS	RMR	VS	*Lr13, Lr37*	*Sr30, Sr38, Sr57*	*Yr17*
Hartog	MR	R	MR	MS	MS	*Lr1, Lr13*	*Sr2, Sr30*	
Hornet	R	R	MSS	R	MS	*Lr13, Lr34, Lr37*	*Sr38, Sr57*	*Yr17, Yr18*
Impala	S	S	RMR	MR	MR	*Lr37, Lr34*	*Sr12, Sr38, Sr57*	*Yr17, Yr18*
Impose CL Plus	RMR	RMR	RMR	RMR	VS	*Lr3a, Lr13, Lr20*	*Sr8a, Sr15, Sr38*	*Yr17*
Janz	MRMS	RMR	RMR	MS	MS	*Lr24, Lr34*	*Sr24, Sr57*	*Yr18*
Justica CL Plus	MSS	MSS	MR	RMR	MRMS	*Lr1, Lr37*	*Sr8a, Sr38*	*Yr17*
Kellalac	S	S	MSS	MRMS	MRMS		*Sr30*	
Kennedy	MRMS	MRMS	MR	MS	MS	*Lr46*	*Sr2, Sr30*	*Yr29*
King Rock	MRMS	R	MS	RMR	VS	*Lr13, Lr37*	*Sr30, Sr38*	*Yr17*
Kord CL PLus	MS	MRMS	MR	RMR	MRMS	*Lr1, Lr37*	*Sr8a or Sr9b, Sr38*	*Yr17*
Kunjin	MSS	MSS	MRMS	MS	MS			
Lang	MRMS	R	R	MS	MS	*Lr24, Lr34*	*Sr24, Sr36, Sr57*	*Yr18*
Leichhardt	R	R	MR	MS	MS	*Lr1, Lr13*	*Sr2, Sr30*	
Lincoln	R	R	MR	RMR	RMR	*Lr34*	*Sr30, Sr57*	*Yr4, Yr18*

	Rust Response					Rust Resistance Genotype		
	Leaf Rust[A]		Stem Rust	Stripe Rust				
	Eastern States	WA		WA pt	Yr17-27 pt	Leaf Rust	Stem Rust	Stripe Rust
Livingston	R	R	MRMS	R	MRMS	*Lr1, Lr13, Lr34, Lr37*	*Sr2, Sr38, Sr57*	*Yr17, Yr18, Yr27*
Mace	MR	R	MR	R	SVS	*Lr13, Lr23, Lr37*	*Sr2, Sr38*	*Yr17*
Mackellar	S[C]	R	MRMS	RMR	RMR	*Lr13, Lr17b*	*Sr2, Sr30*	
Magenta	MS	R	RMR	MS	MS	*Lr24*	*Sr24*	
Mansfield	MS	RMR	SVS	RMR	RMR			
Merinda	R	R	RMR	RMR	MRMS	*Lr13, Lr24, Lr34*	*Sr2, Sr24, Sr57*	*Yr18, Yr27*
Naparoo	R	R	RMR	R	R	*Lr13, Lr24*	*Sr24*	
Orion	R	R	MR	RMR	MSS	*Lr20, Lr37*	*Sr15, Sr38*	*Yr17*
Peake	MR	R	MR	MRMS[D]	MRMS[D]	*Lr13, Lr34, Lr37*	*Sr2, Sr30, Sr38, Sr57*	*Yr17, Yr18*
Petrie	MR	MR	RMR	MS	MS	*Lr13, Lr24, Lr34*	*Sr24, Sr57*	*Yr18*
Preston	R	MR	SVS	RMR	RMR			
Pugsley	MSS	SVS	S	R	S	*Lr37*	*Sr38*	*Yr17*
QAL 3362	MS	-	MRMS	MS	MS			
QAL Bis	R	R	RMR	RMR	SVS	*Lr24, Lr37*	*Sr24, Sr38*	*Yr17*
QAL2000	R	R	RMR	R	VS	*Lr24, Lr37*	*Sr24, Sr38*	*Yr17*
Rosella	MRMS	MR	MRMS	MRMS	MRMS	*Lr34*	*Sr30, Sr57*	*Yr18*
Rudd	R	R	S	R	R	*Lr37*	*Sr38*	*Yr17*
Sabel CL PLus	MSS	MRMS	MR	RMR	MSS	*Lr37*	*Sr38*	*Yr17*
Scout	R	R	MR	RMR	MS	*Lr37*	*Sr38*	*Yr17*
Sentinel	R	R	RMR	RMR	RMR	*Lr26, Lr34*	*Sr2, Sr31, Sr57*	*Yr18*
Snipe	MS	MS	MR	MS	MS	*Lr34*	*Sr57*	*Yr18*
Spitfire	MS	MS	MR	MR	MR	*Lr1, Lr46*	*Sr2, Sr30*	*Yr29*
SQP Revenue	R	R	R	R	R	*Lr13, Lr37+*	*Sr38+*	*Yr17*
Strzelecki	R	R	MRMS	MR	MR	*Lr13, Lr23, Lr34*	*Sr30, Sr57*	*Yr18, Yr33*
Sunbri	MRMS	MR	R	R	MR	*Lr34, Lr37*	*Sr36, Sr38*	*Yr17, Yr18*
Sunco	MR	MR	R	MRMS	MRMS	*Lr24, Lr34*	*Sr24, Sr36, Sr57*	*Yr18*
Sunguard	RMR	RMR	R	MR	MR	*Lr24+, Lr34*	*Sr24+, Sr57*	*Yr18*
Sunlin	MRMS	MR	MRMS	MR	MRMS	*Lr1, Lr13, Lr37, Lr46*	*Sr26, Sr38*	*Yr17, Yr29*
Sunstate	R	R	MR	R	MSS	*Lr1, Lr13, Lr37, Lr46*	*Sr2, Sr30, Sr38*	*Yr17, Yr29*
Sunvale	MRMS	RMR	R	R	MR[D]	*Lr34, Lr37*	*Sr36, Sr38, Sr57*	*Yr17, Yr18*
Sunvex	R	R	R	R	MR	*Lr24, Lr34, Lr37*	*Sr24, Sr38, Sr57*	*Yr17, Yr18*
Sunzell	R	R	MR	RMR	MS[D]	*Lr1, Lr13, Lr37, Lr46*	*Sr2, Sr30, Sr38*	*Yr17, Yr29*
Tammarin Rock	MR	MR	MSS	MSS	MSS	*Lr34*	*Sr30, Sr57*	
Tennant	MSS	RMR	RMR	RMR	RMR	*Lr26*	*Sr31*	*Yr9, Yr18*
Ventura	R	R	RMR	R	MSS	*Lr13, Lr37*	*Sr2, S38*	*Yr17*
Waagan	MS	MR	MS	RMR	S	*Lr34*	*Sr30, Sr57*	*Yr18, Yr27*
Wallup	MS	RMR	RMR	MRMS	MRMS	*Lr13, Lr20, Lr27+Lr31?*	*Sr2, Sr8a, Sr15, Sr30*	
Westonia	MS	S	SVS	VS	VS	*Lr1*	*Sr9g*	
Whistler	MRMS	MRMS	MR	MSS	MSS	*Lr34*	*Sr17, Sr57+*	*Yr18*
Wyalkatchem	MS	MR	MS[B]	S[B]	S	*Lr13, Lr23*	*Sr2, Sr8a[C], Sr15*	*Yr29[C]*
Wylah	MS	MS	MR	MS	MS	*Lr34*	*Sr26,Sr57*	*Yr18*
Yandanooka	RMR	R	MS	S	S	*Lr13+*	*Sr30*	
Yenda	R	R	R	R	S	*Lr37*	*Sr38*	*Yr17*
Yitpi	MSS	MS	S	MRMS	MRMS		*Sr30*	
Young	R	R	MRMS, R[C]	RMR	MS	*Lr37*	*Sr30, Sr36[C], Sr38*	*Yr17*
Zippy	MRMS	MS	MRMS	MSS[D]	MSS[D]	*Lr3a,Lr13, Lr27+Lr31*	*Sr2, Sr8a, Sr30?*	

[A] leaf rust responses are against pathotypes virulent for *Lr13*, *Lr24* and *Lr37* in eastern states. WA responses reflect pathotypes avirulent for *Lr24* and/or *Lr13*

[B] Wyalkatchem in WA: MR-MS to stem rust pathotypes avirulent for *Sr15*; MS to stripe rust

[C] indicates a mixed (heterogeneous) response to the disease or for the presence of a resistance gene

[D] these varieties may show high levels of stripe rust if disease onset is early and may benefit from fungicide protection

[E] indicates a range in response

\- response unknown

Table 3 Disease response of Australian durum varieties to the three rust diseases

	Rust Response		
	Leaf Rust	Stem Rust	Stripe Rust
Caparoi	MRMS	R	MR
EGA Bellaroi	MRMS	R	MR
Hyperno	RMR	R	MR
Jandaroi	MR	R	MR [D]
Kalka	R	RMR	MRMS
Saintly	MRMS	RMR	MRMS
Tamaroi	MRMS	RMR	MR
Tjilkuri	RMR	RMR	MR
Wallaroi	RMR	RMR	MR
Yallaroi	RMR	RMR	MR

Table 4 Disease response of Australian triticale varieties to the three rust diseases

	Rust Response		
	Leaf Rust	Stem Rust	Stripe Rust Tobruk pt
Breakwell	R	R	S
Berkshire	RMR	R	MS
Bogong	RMR	MR	MS
Canobolas	MR	RMR	MSS
Chopper	R	MR	MSS
Crackerjack	-	R	MS
Endeavour	R	R	RMR
Goanna	MR	R	MRMS
Hawkeye	R	RMR	MR, MSS
Jaywick	R	MRMS	MR, MRMS
Kosciuszko	R	R	SVS
Rufus	R	R	MS
Speedee	R	RMR	SVS
Tahara	R	R	MS
Ticket	RMR	RMR	MS
Treat	R	MR	MSS
Tobruk	R	R	MSS
Tuckerbox	R	MR	MRMS
Yowie	R	R	MRMS, MS
Yukuri	R	R	RMR

GENERAL ENQUIRIES

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RUSTED PLANT SAMPLES can be mailed in paper envelopes; do not use plastic wrapping or plastic lined packages.
Direct samples to:

Australian Cereal Rust Survey
Plant Breeding Institute
Private Bag 4011, Narellan NSW 2567

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