

# An industry approach to the assignment of stripe rust, stem rust and leaf rust disease ratings to Australian wheat cultivars

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## Introduction

A nationally co-ordinated whole of industry system for the assignment of reliable stripe, stem and leaf rust (Figure 1) disease response ratings of wheat cultivars and advanced breeding lines was developed. Previously, a lack of national consistency in disease response ratings, privatisation of public wheat breeding during the early 2000s and recurrent stripe rust epidemics following a foreign pathotype incursion in 2002 provided the impetus to develop a consistent approach to assignment of ratings.

## Methods & Materials

Annually, using a single seed source, approximately 200 lines comprising current cultivars and advanced breeding lines (from the National Variety Trial evaluation program) are distributed nationally to plant pathologists for evaluation. Lines are tested in dedicated rust nurseries in diverse cereal production environments. Pathotype identification is provided by the Australian Cereal Rust Control Program (ACRCP). Disease assessment results are added to historic data in a database (Table 1). Both current and historical data are reviewed annually by the cereal pathologists, with consensus rust responses developed and then scrutinised by breeding companies prior to public release. The ratings are published annually in regional disease guides (Fig 2).



Fig 1. Leaf, stem and stripe rust symptom on wheat

## Results

An example of collated current and historical rust ratings along with consensus ratings are shown in Table 1.

Wheat Disease Reactions 2015

Variety	Rust		
	Stem	Stripe	Leaf
Axe	MS	RMR	S <sup>o</sup>
Beaufort	SVS	RMR	MS <sup>o</sup>
Bolac	MRMS	RMR	S
Chara	MRMS	MSS	S <sup>o</sup>
Cobra	RMR	MSS	MR
Condo	RMR	MSS	MRMS <sup>o</sup>
Corack	MR	MS	SVS <sup>o</sup>
Correll	MRMS	MRMS	S <sup>o</sup>
Cosmick	MS	MSS	S <sup>o</sup>
Derrimut	MR	MSS	MS <sup>o</sup>
EGA Gregory	MR	MR	MR
Elmore CL Plus	MR	MRMS	RMR
Emu Rock	MRMS	MRMS	S
Estoc	MR	MS	MRMS
Forrest	RMR	RMR	MSS <sup>o</sup>
Frelon	S	R	-
Gauntlet	RMR	MRMS	MS
Gladius	MR	MRMS	MS
Grenade CL Plus	MR	MRMS	S <sup>o</sup>
Impala	MR	MR	SVS <sup>o</sup>
Justica CL Plus	MR	MRMS	S <sup>o</sup>
Kellalac	MSS	MRMS	S
Kiora	RMR	RMR	MRMS <sup>o</sup>
Kord CL Plus	MR	MRMS	MS
Lincoln	MR	RMR	MSS <sup>o</sup>
Livingston	MRMS	MRMS	MS <sup>o</sup>

Fig 2. Published rust ratings taken from the Victorian Cereal Disease Guide

Table 1. Example of consensus stem rust ratings based on current and historic data collected from multiple field sites nationally

Cultivar	Current Consensus Rating	Previous Consensus Rating			2014 Summary Data				2013 Summary Data			2012 Summary Data					
		2013	2012	2011	Qld	SA (1)	SA (2)	Vic	WA	Qld	SA	WA	Qld	NSW	SA	Vic	WA
Axe	MS	MS	MRMS	MR-MS	MS	R	MS	MS	MS	MS	MS	MRMS	MRMS	R	MRMS	MS	MRMS
Beaufort	SVS	SVS	SVS	S-VS	R	-	MS	SVS	MS	R	SVS	S	MSS	M-S	-	VS	MSS
Bolac	MRMS	MRMS	MRMS	MR	MR	-	RMR	MS	MRMS	MR	R	RMR	RMR	MRMS	MR	MS	MR
Derrimut	MR	MR	MR	MR	RMR	-	-	MRMS	RMR	R	R	MR	R	R	-	-	MR
Impala	MR	RMR	RMR	R-MR	RMR	R	MRMS	RMR	MR	RMR	R	RMR	RMR	R	-	MR	MR
Wyalkatchem	MS	MS	MS	MS	MRMS	R	MRMS	MR	MSS	MS	MS	SVS	S	R	RMR	MR	MSS
Yitpi	S	S	S	S	MS	S	S	SVS	MSS	S	S	S	S	MS	S	S	MSS

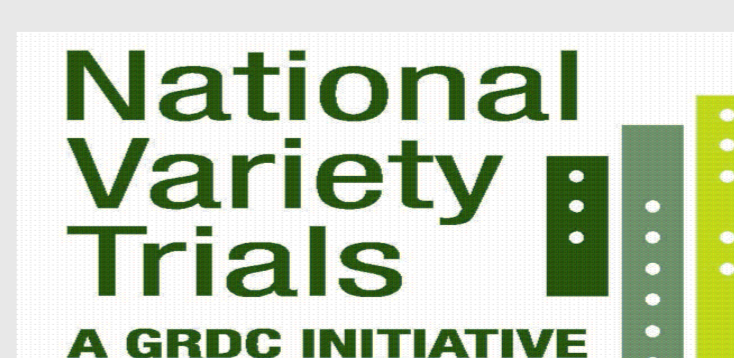
R = Resistant RMR = Resistant to moderately resistant MR = Moderately resistant MRMS = Moderately resistant to moderately susceptible MS = Moderately susceptible MSS = Moderately susceptible to susceptible S = Susceptible SVS = Susceptible to very susceptible VS = Very susceptible

## Conclusions

This whole of industry system has improved timeliness, reliability and consistency of information. Ratings are used widely by Australian farmers to select cultivars to minimise losses due to rusts and to plan appropriate control strategies should resistance be inadequate.



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