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Cereal Rust Report
Season 2006

Stripe Rust Survey Report for 2005

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Seasonal Conditions

The early part of the 2005 season was unusually warm and dry, whereas the latter part brought widespread and above average rainfall. In total however, cropping regions experienced another year of below average precipitation. The low rainfall in the January-May period was exacerbated by unusually warm conditions and increased evaporation rates. The Bureau of Meteorology reported the annual mean temperature across Australia was the warmest on record for this period.

South eastern districts in Eastern Australia experienced very warm and dry conditions at the beginning of the season. An exceptionally warm April was compounded by a very dry May, and this led to delayed plantings. However, the warm conditions also maintained higher soil temperatures, so that crops sown on near record June rain were able to establish quickly. Follow up rain through to October combined with mild winter temperatures encouraged crop establishment and also rust development.

In contrast, Western Australian cropping districts received above average rainfall in the April-May period, leading to ideal conditions for early crop establishment. Temperatures remained generally on average and even slightly below average in the Great Southern, and consequently yields were expected to be very good.

Disease development

Stripe rust (caused by *Puccinia striiformis* f.sp. *tritici*) was first observed in the 2005 cropping season from commercial fields in southern NSW (Tarcutta) in a Whistler crop in early June. This was a relatively early appearance and suggested significant over summer survival of the pathogen.
There were no further reports until late June in the southern NSW region, but the rust was likely to have been developing in some of the early sown fields of Whistler and Wedgetail with ideal conditions of moisture and temperature prevailing during this period. At the end of July, stripe rust was well distributed extending from Temora to Deniliquin in southern NSW, with isolated samples from the north (Coonabarabran, northern NSW) and south (Lake Bolac, Victoria) in eastern Australia. The epidemic developed steadily in August and became

widespread and damaging during September and October. It was clear that the major focus of the epidemic in 2005 was the region of southern NSW. Fungicides were again applied across a wide area, especially south eastern Australia, using ground rig and aerial application platforms.
Although the epidemic began later in Queensland, the disease moved quickly and extended its geographical range to include Bauhinia Downs, some 200 km further north than the previous northern limit reported at Theodore in the epidemics of the mid 1980s. Similarly, the epidemic was relatively slow to begin in Victoria, despite the early samples from Lake Bolac. However, by October the disease was widely distributed from southern Victoria through to the Wimmera; the Victorian Mallee seemed only mildly affected. In South Australia, the first reports were very late (early September) but then became quickly widespread from the south east through to the Eyre Peninsular by mid October. In Western Australia, the epidemic was also late in appearing (early September) and limited in development compared to previous seasons.

Pathotype distribution

A sample size of 393 with nearly 90% recovery of viable isolates was a pleasing aspect of the survey. The distribution of pathotypes recorded in 2005 is presented in Table 1. The dominant pathotype, representing nearly 90% of isolates, was again 134 E16 A+ that was first reported in WA in 2002. The adaptation of this pathotype, including its ability to cause disease on previously resistant wheats and its evident aggressive ability to dominate the pathogen population, continues to be a feature in the epidemics of recent years. Several isolates of this pathotype were recovered from grasses, including *Phalaris* and *Bromus* spp.
Pathotypes detected with less frequency included the VPM pathotype (104 E137 A-, Yr17+) and the H45 pathotype (110 E143 A+). The original pathotype detected in 1979 also continued to be recovered at low frequency, as did pathotype 238 E143 A+ that includes virulence for *Yr9*. These pathotypes, with the exception of the VPM rust, are unlikely to cause serious problems. The VPM pathotype continues to be recovered and will pose a threat to wheats such as QAL 2000 and Trident that are only protected by *Yr17.*
Despite the abundance of pathotype 134 E16A+, and the expected appearance of mutant pathotypes when population size is high, there has been just one new pathotype identified to date that has developed from this rust. Pathotype 150 E16 A+ with virulence for *Yr10* was confirmed following observations of unusual rusting in a field of *Yr10*/Bindawarra by Dr Hugh Wallwork at Wolseley, SA. This pathotype should not pose a threat to bread wheats, since the resistance *Yr10* is not widely deployed in commercial cultivars and the pathotype is therefore unlikely to be selected and multiply rapidly. However, greenhouse tests have shown that this pathotype is also virulent on *Yr24* and *Yr26* which have been shown recently to be the same gene. This resistance derives from durum wheat and so the potential impact of this new pathotype on durums will require assessment.

Pathotype distribution

The dominant pathotype 134 E16 A+ is avirulent for *Yr17* and this resistance continues to provide good protection in varieties that carry this gene, *eg* Braewood, Marombi, Rudd, Sunbri, Sunlin, Sunstate, Sunvale. The adult plant resistance *Yr18* also remains effective and is expected to provide protection, especially when combined with other resistances.

A large number of current varieties are noticeably more affected by stripe rust since pathotype 134 E16 A+ has become widespread. Variety responses to this pathotype are regularly reviewed and published as Cereal Rust Reports, and are available from the PBI website.

Barley Grass Stripe Rust

The disease is caused by an undescribed special form of *P. striiformis* that was first observed in 1998. Sample numbers were again relatively low, and the pathogen continues to be more frequent in southern NSW and Victoria (Table 1). Isolates were generally recovered from barley grass, but also certain cultivated barleys including Maritime, Gairdner and Galleon. No crop losses were reported. Some samples of stripe rust on barley were shown to be the wheat stripe rust pathotype 134 E16 A+.

There continues to be no evidence for stripe rust infection in barley or barley grass in Western Australia.

Table 1 Stripe rust isolates identified by region, 1 April 2005 – 31 March 2006

	Number of Isolates							
	Region 1	Region 2	Region 3	Region 4		Region 5	Region 6	
Pathotype	QLD	NNSW	SNSW	VIC	TAS	SA	WA	TOTAL
104 E137 A-			2					2
104 E137 A- Yr17+		1	5			2		8
110 E143 A+			2	2				4
238 E143 A+	1	1	1					3
134 E16 A+	32	38	132	41		52	25	320
150 E 16 A+						1		1
BGYR		1	11	10		1		23
Miscellaneous			2					2
Total no isolates	**33**	**41**	**155**	**53**		**56**	**25**	**363**
Total no samples	**36**	**44**	**172**	**55**		**59**	**27**	**393**
No failed samples	3	3	17	2		3	2	30

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Cereal rust samples may be collected and posted in paper envelopes to the following address:

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GRDC Grains Research & Development Corporation