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# Cereal Rust Report
## Season 2006

# A New Pathoytpe of Wheat Stripe Rust With Implications for the VPM Resistance

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A new pathotype of *Puccinia striiformis* f.sp. *tritici* (the pathogen of wheat stripe rust) with virulence for *Yr17* has recently been confirmed in greenhouse tests. Isolates of this new pathotype have been recovered in low frequency from southern NSW and Victoria in 2006. The *Yr17* resistance has been very effective to date in protecting varieties carrying the gene, and so this new pathotype can be expected to have some impact on these lines.

## Background

The WA pathotype of wheat stripe rust has been widespread and damaging since its first occurrence in Western Australia in 2002, and since its subsequent appearance in the east 2003. A majority of commercial wheats were distinctly more vulnerable to this foreign pathotype, compared to the earlier pathotypes. Among the wheats that showed excellent resistance to the WA pathotype were those which carry the *Yr17* resistance gene. This gene was originally derived from VPM – an abbreviated pedigree for 'Ventricosum Persicum Marne' that was the first common wheat line to carry this resistance.

## Stripe Rust in 2006

Although extensive drought conditions prevailed throughout much of Australia's wheat producing regions in 2006, those districts fortunate to have reasonable winter rain (parts of northern NSW) or able to draw on irrigation facilities produced useful crops of good yield potential by early spring. Lack of finishing moisture subsequently limited expected yields under dryland production. Nevertheless, wherever crops were in reasonable condition in late winter-early spring, stripe rust was common in varieties known to be vulnerable to the disease. Over 150 samples were received for pathotype assessment.

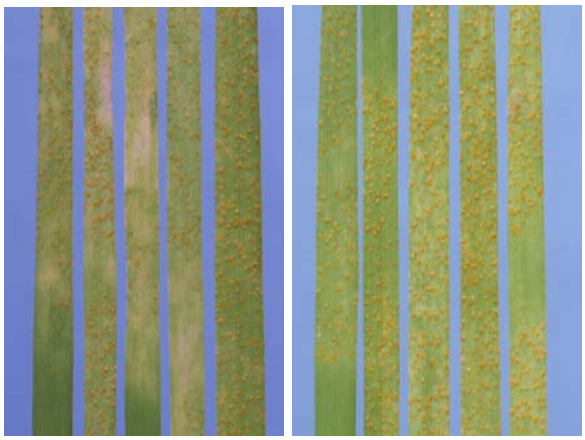
The WA pathotype has continued to dominate the pathogen population. However, rare pathotypes such as the original VPM rust (104 E137 A- Yr17+) have been recovered from varieties such as Camm and

QAL2000 which have little protection other than *Yr17*. This pathotype was first detected in 1998, but has remained rare.

Stripe rust samples were received from an irrigated QAL2000 crop in late October (southern NSW), and from Bowie and Stylet in nursery plots in mid November (Wimmera, Victoria). It was initially expected that these samples would yield the original VPM pathotype. However, greenhouse experiments have recently confirmed that the QAL2000 sample is the WA pathotype with virulence for *Yr17*. The Wimmera nursery samples also appear to be similar from initial observations, and further tests are underway to confirm this.

The new pathotype is designated 134 E16 A+ Yr17+. The contrast between the WA pathotype and the new pathotype is illustrated in Figure 1.

**Figure 1** Wheats carrying Yr17 (left to right: Camm, QAL2000, WA2713, Yr17/AvocetS) and the susceptible control AvocetS.
Seedling leaves to the left infected with 134 E16 A+ (WA pathotype); leaves to the right inoculated with the new pathotype 134 E16 A+ Yr17+.



## Implications for Wheats with *Yr17*

The original VPM pathotype (104 E137 A- Yr17+) that was first detected in 1999 has been recorded at low frequency in eastern Australia, even in recent years when the WA pathotype has almost completely dominated the pathogen population. This pathotype has caused susceptible responses on certain wheats that carry *Yr17* and little supporting adult plant resistance (APR), *ie* QAL2000, Camm, Stylet, Trident. However, this pathotype is relatively avirulent and wheats carrying APR and gene combinations such as *Yr7+Yr17* + APR (*eg* Sunstate) have remained resistant. Details of responses of *Yr17* carrying wheats to this original VPM pathotype are provided in Cereal Rust Report Vol 3, Issue 3, (December 2005).

The occurrence of virulence for *Yr17* in the WA pathotype is likely to cause changes in disease reactions for a range of varieties. This pathotype combines virulence for *Yr17* with virulence for *Yr6, Yr7, Yr9, YrA* and unspecified APR gene/s. The APR gene *Yr18* is expected to remain effective to the new pathotype.

Wheats that have been regarded as resistant to stripe rust and now remain under question include: Carinya, Ellison, Braewood, Marombi, Pugsley, Rudd, Sunbri, Sunlin, Sunstate, Sunvale, Ventura, Young. The extent of change in disease response will be assessed in greenhouse trials currently underway and in field plot nurseries in 2007. Data will be circulated as it becomes available.

The implications for varietal choice in 2007 will depend on the distribution of the new pathotype, and this in turn will be governed by opportunities for summer survival and re-emergence of the new pathotype in the new cropping season. However, it is clear that all varieties with *Yr17* will have to be considered vulnerable and will therefore need to be carefully monitored during the growing season.

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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