

Stripe rust - an update on the *Yr17* pathotype

Dr Colin Wellings

Principal Research Scientist

Seconded to University of Sydney, PBI Cobbitty

Jan Edwards

District Agronomist, Cowra

Robert Thompson

District Agronomist, West Wyalong

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This is to be read in conjunction with *Stripe rust: Understanding the disease in wheat* NSW DPI.

Key Points

- A new and virulent pathotype of wheat stripe rust has evolved from the 'WA' pathotype.
- The new pathotype is expected to alter the ratings of many wheats carrying the *Yr17* resistance gene. Their resistance to the WA pathotype remains unchanged.
- Farmers should not be discouraged from sowing *Yr17* varieties this season, however a fungicide application may be needed.
- Monitor these crops and send all rust samples to the Australian Cereal Rust Survey.

Stripe rust

Wheat stripe rust can develop on triticale, barley, barley grass, brome grass and some other grasses, but wheat is the main host.

Wind spreads spores of stripe rust from pustules that develop on infected leaves. If the spores land on another living wheat leaf, they can germinate and infect the leaf. The rust grows inside the leaf and then produces pustules containing new spores.

Disease resistance

There are two different forms of genetic resistance to stripe rust: seedling resistance and adult plant resistance.

Seedling resistance

Seedling resistance operates throughout the life of the plant and is highly effective. However, it is usually controlled by a single gene.

New pathotypes can overcome single-gene seedling resistance relatively quickly unless it is combined with other genes for resistance.

One form of seedling resistance in several current varieties is the *Yr17* or VPM resistance gene.

Several of the VPM varieties have good adult plant resistance that can help protect the variety should the seedling resistance be overcome.

Adult plant resistance (APR)

Adult plant resistance (APR), develops as the plant matures. APR usually develops some time during the booting stage, but can develop earlier during stem elongation, or be delayed until early head emergence, depending on variety and growing conditions.

Combinations of APR have proven to be the most effective resistance under Australian conditions.

Pathotypes of stripe rust

Wheat stripe rust is a highly variable pathogen. New variants or pathotypes (races, strains) are continually developing.

The Western Australian pathotype

The damaging 'WA' pathotype entered Western Australia in 2002. It has been the main pathotype present in eastern Australia since 2003. During this period, wheats with the *Yr17* or VPM resistance gene have been protected from disease.

Now, a new pathotype has evolved, which is considered virulent with to the *Yr17* resistance gene. It has the ability to cause disease on most *Yr17* wheats.

Yr17 or VPM pathotype

Three of the 150 rust samples submitted to the Plant Breeding Institute Cereal Rust Laboratory at the University of Sydney in 2006, were found to be the new *Yr17* pathotype. The samples were from Coleambally in southern NSW and Horsham in Victoria.

The new pathotype is a mutation of the 'WA pathotype', so it is assumed it could be as 'aggressive' and widely adapted as its parent pathotype. However, the exact biology of this new



pathotype and its impact on yield remains unknown.

Until now the *Yr17* gene has been a major defence against stripe rust for varieties grown in NSW, including Carinya, Ellison, Marombi, Sunbri, Sunlin, Sunstate, Sunvale and Ventura.

All *Yr17* varieties still have a high level of resistance to the 'WA pathotype' however, their ratings are under review for the new pathotype. Reliable field data for new ratings will not be available until spring.

It is important to note that varieties which contain *Yr17*, may also contain other minor resistance genes and adult plant resistance genes. These genes may offer protection.

Management for 2007

To be a threat to *Yr17* varieties in NSW in 2007 the new pathotype must survive over-summer on host plants, then multiply rapidly and spread over the rest of the state.

To date, the new pathotype has only been found at Coleambally in southern NSW and Horsham in Victoria. The early detection of this new pathotype will hopefully provide some advanced warning for wheat growers.

At this stage, there is no reliable field data on the reaction of the current varieties. Testing is continuing and results should be available by spring.

The opportunity to change variety in 2007 may be limited. If farmers have a choice, EGA_Gregory and Strzelecki still have resistance to the new pathotype. However, farmers should not be discouraged from growing potentially vulnerable *Yr17* wheat varieties this season.

All varieties should be treated for smuts and bunts. Consider the use of a seed dressing which also gives protection for stripe rust. Seed dressings offer early protection at minimum cost.

In-furrow fungicide applications should be carefully considered. They are more expensive and have substantial grazing withholding periods.

It may be more economic to budget for a timely in-crop fungicide application, if warranted, later in the season.

For these reasons all *Yr17* varieties will need to be carefully monitored during the 2007 growing season.

Monitoring rust pathotypes

Each year, Sydney University's Plant Breeding Institute surveys Australia for pathotype variation in all the cereal rusts. The survey relies heavily on cooperators sending rust samples for pathotype identification.

If you notice any unusual or unexpected development of rust, please report it. It is also important that the first sightings of rust in a district be sent for the survey.

Rust samples should be sent in paper envelopes (not plastic bags), marked with name and address and the date, location, variety and growth stage. Leaves and stems with active pustules are required.

They should be posted without delay to: Rust Survey, Plant Breeding Institute Cobbitty Private Bag 11, Camden, NSW 2570.

Contacts for further information

Colin Wellings

02 9351 8826, colinw@camden.usyd.edu.au

Jan Edwards

02 6349 9777, jan.edwards@dpi.nsw.gov.au

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