

Cereal Rust Report

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New barley leaf rust pathotype detected in Western Australia

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A new pathotype of the barley leaf rust pathogen, *Puccinia hordei*, was detected in Western Australia from samples collected in mid-September August 2013. The new pathotype, 5457 P-, is a single-step mutational derivative of an existing pathotype, 5453 P-, with added virulence for *Rph3*. This is the third pathotype of *P. hordei* recorded in Australia with virulence for *Rph3*. The new pathotype is very similar to one detected in northern NSW in late 2008, pt. 5457 P+, but differs in being avirulent for *Rph19*. It is expected that the new pathotype will not alter the response of barley cultivars in eastern Australia, should it migrate to this region. Tests are currently underway to assess its full impact on cultivars (Bass, Fairview, Finnis, Fitzroy, Grange, Henley, Oxford, Wimmera and Yarra) and advanced breeding lines carrying the gene *Rph3*. The leaf rust response of 3 of these cultivars (Grange, Henley, Oxford) is not expected to change markedly due to the additional presence of the adult plant resistance gene *Rph20*.

Seven samples of leaf rust from barley crops from WA (Boxwood Hill, South Stirling, Chillinup, Kamballup) that were collected in mid-September were forwarded to the Plant Breeding Institute Cobbitty (PBI) for pathotype analysis. All 7 samples were identified as pathotype 5457 P-, not previously recorded. This pathotype represents the first occurrence of virulence for resistance gene *Rph3* in WA.

Tests are currently underway to assess the full impact of this new pathotype on cultivars (Bass, Fairview, Finnis, Fitzroy, Grange, Henley, Oxford, Wimmera and Yarra) and advanced breeding lines carrying the gene *Rph3* in WA. The leaf rust response of 3 of these cultivars (Grange, Henley, Oxford) is not expected to change markedly due to the additional presence of the adult plant resistance gene *Rph20*. The remaining 6 cultivars were all rated as susceptible in field tests from 2009-2010 at PBI when challenged with the closely related and *Rph3*-virulent pathotype 5457 P+. It should be noted however that if any of these cultivars carry *Rph19* in addition to *Rph3*, they will carry some residual resistance to the new

pathotype detected in WA, which is not effective in eastern Australia to 5457 P+.

Nine additional leaf rust samples received from WA (Chillinup, Gnowellen, Grasspatch, Kellerberrin, Kojonup, Shenton Park, South Stirling, Wellstead) for pathotype analysis to date in 2013 have all been typed as either pt. 5453 P- or pt. 5453 P+.

Origin of the new pathotype

Pathotype 5453 P- is considered to have originated via single- step mutational acquisition of virulence for the resistance gene *Rph3* in an existing pathotype, 5453 P- (Figure 1). This is the founding (parent) pathotype of a lineage that now comprises 4 pathotypes. It was first detected in WA in 2001, and is of unknown origin. Following the initial detection, pt. 5453 P- acquired virulence for *Rph19* (pt. 5453 P+, 2002), and both pathotypes were subsequently detected in eastern Australia where they have since become widespread. In early 2008, a mutational

derivative with virulence for *Rph3*, pt. 5457 P+ was detected in northern NSW. The detection of a second mutation to virulence to *Rph3* reported here, brings to 3 the number of pathotypes with virulence to this gene detected in our annual pathogenicity surveys (the third pathotype, 5656P+, was detected in SA in 2011).

Conclusion

Growers of any of the 9 cultivars listed above as carrying resistance gene *Rph3* in WA and in eastern Australia should monitor crops closely, and forward samples of any leaf rust detected to the Plant Breeding Institute for pathotype analysis.

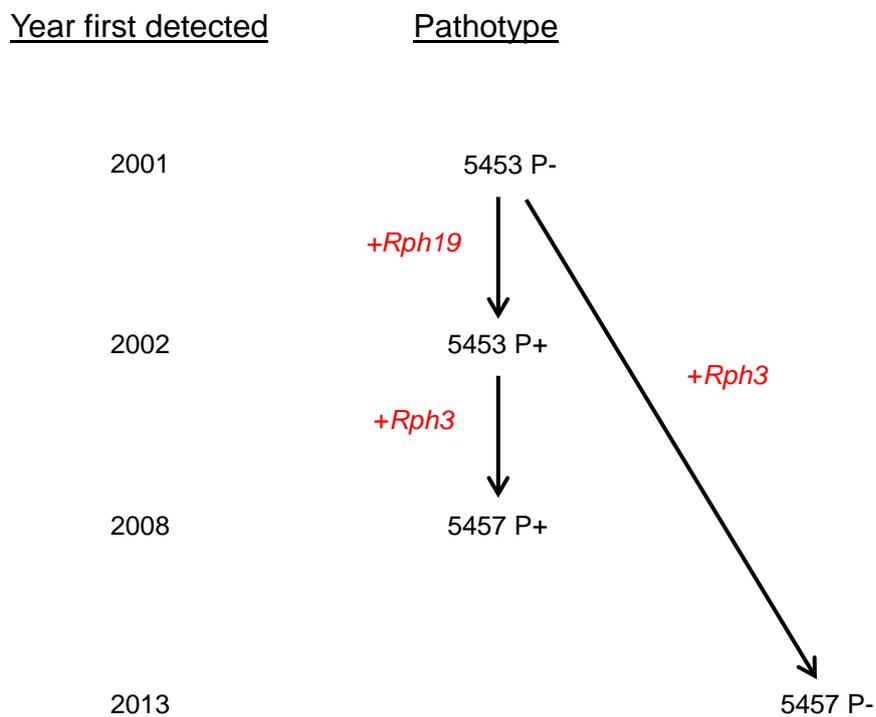


Figure 1: Derivation of three new pathotypes of the barley leaf rust pathogen *Puccinia hordei* via single- step mutation from a common ancestor, first detected in WA in 2001.

GENERAL ENQUIRIES

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 Narellan NSW 2567

 107 Cobbitty Road
 Cobbitty NSW 2570
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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

The Australian Cereal Rust Control Program is supported by growers through the Grains Research & Development Corporation.

