

# Elusive rust resistance genes located

6 December 2006

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The discovery of a DNA marker for two key rust resistance genes is enabling plant breeders around the world to breed more effective rust resistant wheat varieties.

The genes, Lr34 and Yr18 are inherited together and provide wheat plants with improved protection against leaf rust and stripe rust – two major diseases of wheat in Australia and worldwide.

CSIRO Plant Industry scientist, Dr Evans Lagudah, says various types of rust resistance have been bred into Australian varieties but work against a specific rust species and in some cases are only effective against a limited range of rust strains.

"We have identified a 'DNA marker' that is 99 per cent effective in flagging the presence of Lr34 and Yr18, which provide resistance against different species and strains of rust," Dr Lagudah says.

"This means that breeders can track the presence of this rust resistance through a simple DNA test. If the marker is present then it's almost guaranteed Lr34 / Yr18 will be too."

Plant breeders have long recognised the usefulness of Lr34 / Yr18, which work together with other rust resistance genes to boost the plants' capacity to defend itself.

Wheat plants that contain the Lr34 / Yr18 combination of genes also experience slower rates of rust infection. This prevents widespread and rapid increase of rust spores reducing the potential for disease epidemics throughout the crop.

"Up until now it has been difficult to track Lr34 / Yr18 in wheat because of the masking effect of other resistance genes," Dr Lagudah says.

"In addition, tests for Lr34 / Yr18 were slow and could only be done once per season and on adult plants growing in the paddock.

"Using the marker technology breeders can now

quickly and easily test seedlings for the presence of Lr34 / Yr18, to establish known and unknown genes, and ideally combine different sources of resistance to speed up the delivery of new rust resistant wheat varieties."

The marker has proven effective in a range of wheats from different backgrounds including from Australia, India, China, North America and the major wheat research centre, CIMMYT.

Breeders in Australia and across the world are now using the marker so that the durable rust resistance offered by Lr34 / Yr18 can be incorporated into locally adapted wheat varieties.

Source: CSIRO Australia

APA citation: Elusive rust resistance genes located (2006, December 6) retrieved 24 November 2020 from <https://phys.org/news/2006-12-elusive-rust-resistance-genes.html>

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