



CASE STUDY OF IMPACT  
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# Fighting the global threat of cereal rust disease



CSIRO research is preventing crop losses, improving grain quality and yields for Australian grain growers.

## The challenge

Rusts are a common fungal disease of plants, including many of Australia's cereal and horticultural crops. They are prevalent in most wheat growing areas around the world, threatening global wheat yields. As rust pathogens are adaptable and can evolve into new strains attacking previously resistant plants, it is imperative that new varieties are constantly developed to avoid major crop losses.

## The response

CSIRO has been contributing to the global fight against rust for several decades. CSIRO's research, as part of the Australian Cereal Rust Control Program funded by the Grains Research and Development Corporation (GRDC), has focused upon the interaction between the rust pathogen and the crops it

attacks. The research has provided the wheat industry with genetic markers that simplify the conventional breeding of rust resistant wheat.

These markers allow breeders to identify wheat varieties containing resistance genes which prevent rust infecting the plant or help the plants successfully battle a rust attack. To date, CSIRO has provided wheat breeders with markers for more than 20 resistance genes.

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It is estimated that globally 5.47 million tonnes of wheat are lost to the stripe rust pathogen each year, equivalent to a loss of US\$979 million<sup>1</sup>.

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## The impact

CSIRO's cereal rust research has led to a range of impacts. Economic benefits include higher yields for Australian grain growers and reduced costs through avoided fungicide application. The improved capacity of grain growers to prevent rust epidemics potentially contributes to greater stability in production and, at a national level, a higher level of food security.

A recent economic assessment estimates the net present value (NPV) of CSIRO's rust research for the wheat industry is approximately \$382 million with \$290 million attributable to CSIRO<sup>2</sup>.

<sup>1</sup> Beddow et al., 2015. *Research investment implications of shifts in the global geography of 344 wheat stripe rust*. Nat Plants 1:15132.

<sup>2</sup> CSIRO, 2016. *Research Impact Evaluation – Cereal Rust Case Study*. CSIRO, Canberra.

## CONTACT US

t 1300 363 400  
+61 3 9545 2176  
e [csiroenquiries@csiro.au](mailto:csiroenquiries@csiro.au)  
w [www.csiro.au](http://www.csiro.au)

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Dr Michael Ayliffe  
Agriculture and Food  
t +61 2 6246 5221  
e [michael.ayliffe@csiro.au](mailto:michael.ayliffe@csiro.au)  
w [www.csiro.au/impact](http://www.csiro.au/impact)