AgroSpectrum ASIA
Envisaging Future | Updating Present

Australia's GRDC announces major investments to combat Septoria tritici blotch in wheat

29 January 2024 | News

NSW DPI, ANU and GRDC are investing $8 million over five years to identify novel STB resistance genes and incorporate them into new Australian wheat varieties.

NSW DPI, ANU and GRDC are investing $8 million over five years to identify novel STB resistance genes and incorporate them into new Australian wheat varieties.

Australia's Grains Research and Development Corporation (GRDC) has announced a series of investments to reduce the impact of the wheat disease Septoria tritici blotch (STB).

The three GRDC investments are:

- Project 1: Identifying genes for STB resistance
- Project 2: Testing gene combinations for STB resistance
- Project 3: Understanding the cause of STB

STB is a persistent issue for wheat growers in the high and medium rainfall zones of the northern and southern grain growing regions. If left unmanaged STB can reduce yields by up to 50%. Traditional control by fungicides is estimated to cost the industry $121 million per year, however resistance to some common fungicides including triazoles and strobilurin used to control STB is evolving. Together, the NSW Department of Primary Industries (NSW DPI), the Australian National University (ANU) and GRDC are investing $8 million over five years to identify novel STB resistance genes and incorporate them into new Australian wheat varieties. GRDC genetic technologies officer Prameela Vanambathina says the investments will approach the STB problem from three different angles.

â??We are seeking to identify novel resistance genes, optimal combinations of adult plant resistance genes and understand plant pathogen interactions. We hope these three investments will provide tools and knowledge essential to reduce the impact

of the disease for Australian grain growers. Most wheat varieties are susceptible to STB, leading to increased use of fungicides to control the disease. Thereâ??s a growing fungicide resistance problem, and the identification of new seed sources resistant to Australian pathotypes is crucial. Previous GRDC investment with NSW DPI and ANU has already identified genes that can contribute to adult plant resistance to STBâ? explains Vanambathina.

Project 1 â?? Identifying genes for STB resistance

The first of the three projects aims to discover and transfer novel adult plant resistance genes for STB resistance into wheat breeding programs. The project will be led by Dr Andrew Milgate (NSW DPI) and aims to identify novel genetic resources that are resistant to STB under Australian environments. The investmentâ??s objectives include identifying and characterising novel sources of adult plant resistance from international and Australian germplasm pools, validating these genes and transferring the genetic potential into elite Australian wheat lines.

Project 2 â?? Testing gene combinations for STB resistance

The focus of the second project is on testing optimal combinations of these genes to identify the best ones, and a smaller number of genes for stable adult plant resistance. Dr Milgate says this partnership will see different combinations of resistance genes, previously identified by NSW DPI researchers in Wagga Wagga, to be bred into wheat varieties. Combining these high-quality genes together provides added, more stable protection and ensures the genes continue to be effective against STB, which can evolve new virulence rapidly. Having molecular markers makes it much faster and more accurate to bred wheat with the desirable resistance genes, meaning new wheat with improved STB resistance can be delivered to growers sooner.

Project 3 â?? Understanding the cause of STB

ANU Professor Peter Solomon says the University is pleased to continue its long-standing partnership with GRDC to tackle diseases that affect the viability and productivity of wheat in the third STB project.

â??Despite the impact that STB has on growers, disease and genetic resistance remains poorly understood. â??This investment by GRDC will enable us to work with colleagues at Birmingham University in the UK to dissect the interaction between key pathogen proteins responsible for virulence and their corresponding host resistance genes in progressing disease. The outcomes will significantly advance our understanding of how the fungus Zymoseptoria tritici causes STB. The data generated will be used to develop an approach for screening disease-resistant cultivars"Â Professor Solomon says.