



Plant breeders are hoping that taking wheat out of the field and growing it in warehouses will speed up the development of new varieties. (PHOTO: QAAFI)

The authors hope that by speeding up the generation time for a crop like wheat, genetic improvements can be delivered to farmers quicker, producing more food with fewer resources.

Using all the 'tools in the shed'

Speaking from St Petersburg where plant breeders from around the world were meeting to discuss the challenge of climate change and population growth, Lee said the world needed to produce an extra 60–80 per cent more food.

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UQ research fellow Kai Voss-Fels is investigating how root structure impacts drought resilience. (PHOTO: QAAFI)

"It's really important that we're adopting all the tools in the shed when it comes to technologies," he said.

"And I would say that includes technology like GMO."

While his work started in wheat, Lee said it was also important to adapt the technology to less-common crops often used in developing countries.

"As of next year we'll be building facilities in places like India, Mali and Zimbabwe," he said.

"This will help fast-track breeding for crops that haven't had much investment like sorghum, millets and peanuts.

"These crops are so critical to nutrition and global food security in those regions."

Getting to the root of the problem

While Lee is keen to see more investment in a variety of crops, wheat was still one of the most important food sources providing 20 per cent of the world's daily calorie intake.

But last year, wheat yields were down in Australia and Europe, which Kai Voss-Fels from the Queensland Alliance for Agriculture and Food Innovation said reaffirmed the need to quickly find wheat types which are robust and resilient.

"Farmers reported 30 to 70 per cent crop losses and some crop failures in Germany," Kai said.

"So farmers there are also speaking up and asking for better adapted varieties."

Kai was working with international plant scientists to investigate the root structure of drought-tolerant wheat varieties.

He said roots are important as they are the interface for water and nutrient intake.

"Roots are complicated because the plant can only produce so much carbohydrates," he said.

"It's always about resource allocation and how much energy a plant should put into growing roots or how much energy should it put into grain filling."

Kai said an international effort, involving researchers from across Europe and Mexico, was testing some of the best wheat varieties.

"Basically we are taking important wheat varieties and making copy versions of them but with modified roots to then test under specific environmental conditions," he said. ■

Debunking the myth about wheat breeding and allergies

AT A GLANCE...

- Charles Sturt research examined allergenicity of 170 Australian wheat varieties.
- One of the most allergenic varieties was one grown in the 1800s.
- It's hoped the research will contribute to the development of low-allergenic wheat varieties.

NEW research has debunked the myth that all early varieties of wheat were less allergenic than the varieties grown on Australian farms today.

Charles Sturt University (Charles Sturt) PhD candidate Mr Chris Florides has investigated 170 wheat varieties as part of his research through the Australian Research Council (ARC) Industrial Transformation Centre for Functional Grains (FGC).

"Wheat allergies or gluten intolerance has become a key talking point, not only for people who have diagnosed allergies or consumers who eat gluten-free, but also for wheat breeders and food processors," Chris said.

"If you search the internet or social media, there's a lot of speculation that early wheat varieties were not immunogenic and that modern genetic techniques have created wheat varieties that are more allergenic.



PhD candidate Chris Florides from the Functional Grains Centre says he hopes his research helps in the development of low-allergenic wheat varieties.

"My research examined the allergenicity of wheat varieties grown in Australia from 1860 to 2015, including some original varieties brought from England that were bred to suit Australian conditions.

"The study found that one of the most allergenic varieties was one grown in the 1800s."

Chris has also developed a diagnostic method and created databases with information on the allergenicity of these wheat varieties.

"I found there is variation in the levels of allergenicity and it's hoped varieties with a low content of immunoreactive proteins can now be used in wheat breeding programs and the ones with high content avoided," Chris said.

"It is not possible to develop completely non-allergenic wheat because the gluten proteins – which are responsible for the immunogenic effects of bread and other wheat products – are necessary for the functionality of the flour used to make these products.

"But I hope that my research will contribute to the development of low-allergenic wheat varieties that could be made into products suitable for people who have mild gluten intolerance."

FGC Director Professor Chris Blanchard said, "This is an example of the research at the Functional Grains Centre that's responding to the interest that consumers have regarding the impact of food on their health.

"Ultimately, developing products to meet consumer demands will benefit the entire grains value chain."

Funded by the Australian Government through the ARC's Industrial Transformation Training Centres scheme, the FGC is administered by Charles Sturt University and is an initiative of the Graham Centre for Agricultural Innovation.

An advertisement for Dinner Plain. It features a large background image of a mountain landscape with a lodge. Three circular inset images show people hiking, a horse, and a person on a motorcycle. The text is arranged in a clean, modern layout with a blue and white color scheme.

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