

Scientists are exploring taking crops out of the field and growing them in warehouses to develop new varieties capable of feeding 10 billion people by 2050.

'Plant factories' needed to feed a growing world population

By Kallee Buchanan and Amy Phillips, ABC

AT A GLANCE...

- The United Nations expects the world population will reach 10 billion by 2050.
- Twenty per cent of the world's daily calories come from wheat, but it takes a long time to breed new varieties.
- Indoor 'speed breeding facilities' are growing 1000 plants per square metre.
- Researchers are growing up to six generations of crops in a year instead of just two generations.
- The technology has been used on crops including wheat, barley, chickpea, millet, sorghum and quinoa.

A REVIEW in the journal *Nature Biotechnology* has outlined efforts to harness technology like speed breeding, genome editing, growing crops indoors, and manipulating the temperature and atmosphere to fast-track new varieties of major crops like wheat and corn.

Lead author Lee Hickey, a senior research fellow at the University of Queensland, said a suite of new technologies will increasingly be needed to feed the world as resources dwindle.

"Plant breeders want to deal with thousands of plants, so

we need to find a way to really scale up these technologies and reduce the costs," Lee said.

"What we're trying to do is create a plant factory – growing the greatest number of plants in the smallest space possible.

"Some of these crops, we're growing them at a rate of 1000 plants per square metre and setting up these speed breeding facilities indoors. We're actually creating warehouses."

By taking crops out of the field and growing them in controlled conditions, variables like soil, water, light, and even the carbon dioxide levels in the atmosphere can be controlled.

The technique builds on a speed breeding protocol developed by Lee that allows plant breeders to grow up to six generations of crops in a year instead of just two.

The technology has already reduced time it takes to select traits like disease resistance, drought tolerance and nutrition in critical food crops like wheat, barley, chickpea, millet, sorghum and quinoa.

"But it's still just one tool in the shed for a plant breeder," Lee said.

"What we propose is really that we need to bring all these technologies together and then a real step-change is possible in terms of making these crops more resilient in the face of changing climatic conditions."



UQ research fellow Dr Lee Hickey says speed breeding blends well with other plant development techniques. (PHOTO: QAAFI)