Drought tolerance gene discovered

An international group of plant scientists, led by Dr Gonzalo Estavillo and Professor Barry Pogson at The Australian National University, Canberra, have discovered a subtle mutation in Arabidopsis, a small, rapid growing plant, which may have important and far reaching implications for establishing drought resistance throughout the plant kingdom.

"This work actually began when we were looking at different mutant varieties of Arabidopsis that had unusual responses to high light," said Gonzalo. "We discovered a particular mutant gene called SAL1 that enabled plants to survive longer without added water, and seeing the obvious potential, we began to investigate."

ANU researchers Lisa Chew, Nok Pornsiriwong and Gonzalo Estavillo are part of an international team that has discovered a subtle mutation in the Arabidopsis plant which may have important implications for establishing drought resistance in food crops.
(PHOTO: James Giggacher)

One potential the group is currently exploring is the application of the mutation to food crops such as rice or wheat, and the researchers will now begin to introduce the mutant characteristics into the elite wheat cultivars currently used in commercial agriculture.

"The ultimate aim of the project is to develop wheat lines with improved drought tolerance and water use," explained Gonzalo. "The next step will be to identify wheat mutant plants lacking SAL1 genes identified by molecular biology procedures. We expect that these mutants should remain green, turgid and photosynthetically active, producing more leaves, flowers and seeds during mild to moderate water deficit."

Estavillo points out that with most climate models predicting that the vast wheat growing areas of southern Australia will become drastically drier over the next 50 years, the prospect of drought resistant wheat offers much promise for ensuring long term food supply and economic well-being.

This has been recognised by the Grains Research and Development Corporation, which recently provided further project funding to identify genetic variants of the SAL1 gene in wheat. The project will also involve researchers from CSIRO Plant Industry.

Less controversial breeding method

The SAL1 mutation also has the advantage of facilitating less controversial solutions to the enhancement of food crops.

Because the basis of the mutation is a missing gene it would also be potentially possible to create drought tolerance in a plant like wheat without employing transgenic methods which rely on splicing genes into existing genomes.

Instead, using traditional plant breeding techniques, drought resistance traits could potentially be introduced through a process of interbreeding, alleviating both public concerns about GM food stock, as well as introducing drought resistance to commercial varieties of the plant as quickly as possible.

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