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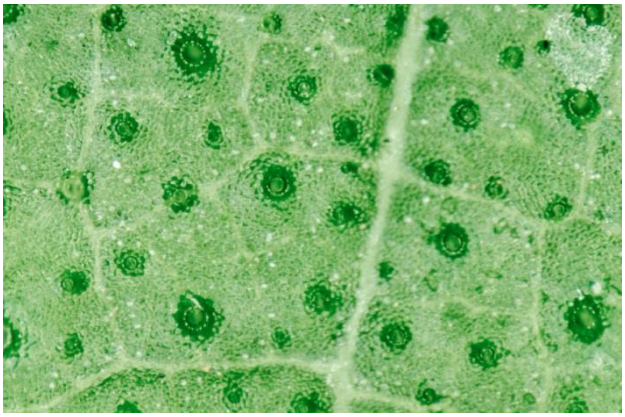
# RESEARCH DIRECTIONS

## What are the mechanisms of drought tolerance in plants?

**Dr Zhong-Hua Chen, of the School of Science and Health, has been awarded a prestigious Australian Research Council Discovery Early Career Award (DECRA) to investigate the effects of drought on photosynthesis and stomatal behaviour of plants under stress.**

'Drought or water scarcity is a major determinant of reduced crop yield', says Dr Chen. 'Drought is not only a domestic issue for people who live in our dry Australian continent but it also significantly affects global food supply. Drought regulates movement of particular cells in plants - stomatal guard cells. These are specialized cells mainly located in the leaf epidermis of plants and they exert major controls on global water and carbon cycles. Although the total stomatal pore area may be 5 per cent of a leaf surface, transpirational water loss through these pores contributes to 70 per cent of total agricultural water usage. This project seeks to understand the cellular feedback mechanisms induced by drought and their regulation of stomata. The outcomes will aid the development of strategies for reducing water loss from crops.'

During the fellowship, Dr Chen will investigate the effects of drought on photosynthesis, and stomatal behaviour using recently developed mathematical models and molecular physiological methods. Comprehensive physiological and molecular biological analysis will ensure deep insight into mechanisms underlying plant response to drought stress, one of the most challenging global issues. This project will bridge gaps in knowledge to understand how stomata open and close while facing drought at cellular and molecular levels.



Stomata play a central role in responding to plant drought stress. Understanding the mechanisms of drought induced molecular signals and their regulation over stomata is critical to reducing water loss in crops and maintaining a high photosynthetic rate for better yield. This project will contribute to the future development of crops which will be better able to adapt to dry and hot environments.

**Project Title:** An electrophysiological insight into the role of chloroplasts in stomatal drought signalling
**Funding has been set at:** $399,201
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**July 2014**