Public Abstract

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Graduation Term:FS 2015

Department:Plant, Insect and Microbial Sciences

Degree:PhD

Title:MECHANISMS OF STRESS TOLERANCE IN PLANTS

Environmental stress conditions such as drought, salt stress and pathogenic fungi affect negatively plant growth and productivity. Therefore, it is necessary to search for new genetic components and strategies for improving resistance and tolerance in crops. In the present thesis, we describe two different approaches that increase our understanding of mechanisms of stress tolerance in plants. The first approach is to study an extreme adaptation to drought tolerance from a grass that can resurrect after being completely dried. The second approach addresses how plants might respond to two different stresses simultaneously (salt stress and pathogenic fungi), and how one stress can enhance the response to the other. In the first study, we found some important insights into the gene regulatory mechanisms used by a resurrection grass to cope with severe drying conditions. These genes are considered potential candidates for engineering drought tolerant crops. In the second study, we demonstrate a physiological and biochemical link between salinity stress and chitin-triggered innate immunity. Chitin treatment can enhance salinity stress responses in plants and we found how a protein complex comprised by chitin receptors, CERK1 and LYK4, and ANN1, a salt-induced calcium permeable channel, are necessary to modulate early responses to both stresses. Understanding these layers of this crosstalk may lead to more sustainable methods to employ innate immunity to protect against both biotic and abiotic stress induced crop losses.