Tiny mutation makes plants less resistant to stressful conditions

February 24 2017, by David Stacey

Credit: University of Western Australia

Scientists from The University of Western Australia have identified a tiny mutation in plants that can influence how well a plant recovers from stressful conditions, and ultimately impact a plant's survival.

The researchers, from the ARC Centre of Excellence in Plant Energy Biology, in collaboration with CSIRO, carried out a long-term study, following the discovery of the mutation in the genetic makeup of a plant that alters its ability to recover from stressful factors.

In order to survive being rooted to one spot, plants must adapt fast to stresses in their environment, which include pathogens and harsh changes in weather and temperature. The researchers chemically induced

stress in the roots of plants, treating them with salicylic acid, to examine the signalling response inside of the plants' cells.

They observed key changes in a particular enzyme (called succinate dehydrogenase) that leads to the complete loss of stress signalling. The impact of this tiny change is an inability of the plant to fight off disease-causing pathogens.

Lead researcher Ms Katharina Belt, said the finding suggests that this enzyme plays an important role in plant resistance to pathogen-induced stress.

"It is astonishing to realise that the part of the plant that we knew is responsible for energy production, is also involved in how plants cope with stress," Ms Belt said.

Ms Belt said that a better understanding of how plants deal with stress could open up new opportunities to develop stronger plants for the future.

"Much research is needed to address the dramatic impacts of a growing population and decreasing agricultural land," she said.

"It is hoped that this research will contribute to the science community's thinking about how to create more efficient and robust plants.

"This could help to combat food security issues we face in these times of climate change."

The researchers plan to use these findings to drive further research into how to equip plants with a more efficient stress response, making them more resilient. This could become an important new step in improving agricultural yields.

The research was recently published in *Plant Physiology Journal*.

More information: Katharina Belt et al. Salicylic acid-dependent plant stress signalling via mitochondrial succinate dehydrogenase, *Plant Physiology* (2017). DOI: 10.1104/pp.16.00060