



TECHNOLOGY

Novel Method of Enhancing Drought Tolerance of Crop Species by Genetic Control of Stomatal Opening and Closure

OVERVIEW

Background

Plants have developed sophisticated mechanisms to cope with and adapt to changes in the environment. For instance, the opening and closing of the stomata (pores found on the leaf surfaces assist in gas exchange and water transpiration, necessary processes for photosynthesis), is tightly regulated via multiple pathways to help plants constantly adjust to environmental changes such as light, water and carbon dioxide. Understanding the molecular basis of these regulatory mechanisms could enable the creation of drought-tolerant and crop cultivars.

Innovative Technology

Researchers at the University of Maryland have developed a novel approach to engineer drought tolerance in plants through genetic manipulation of a highly conserved protein that regulates stomata opening and closure in a guard cell specific and drought-inducible manner. While proof-of-concept studies were conducted using the genetic model plant, *Arabidopsis thaliana* (Wall cress), this technology can be used in a wide variety of crop plants due to the highly conserved nature of the mechanism in regulation of stomatal activity.

Advantages

1. This method uses spatio-temporal regulation of genes and hence minimizes any potential unwanted effect on plant productivity
2. The same genetic construct could be used in any crop plant
3. Environmentally friendly

Applications

1. Currently being used in Tomato and Poplar plants to enhance drought resistance
2. Can potentially be used to enhance drought tolerance in any plant

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Additional Information

INSTITUTION

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PATENT STATUS

Patent(s) pending

LICENSE STATUS

Available for exclusive or non-exclusive license

CATEGORIES

- Agricultural

EXTERNAL RESOURCES

- [US Patent 9,096,862](#)

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