CURF
Clemson University Research Foundation

Using miR319 gene to Enhance Abiotic Stress Tolerance in Transgenic Plants (2011-026)

Transgenic plants overexpressing miR319 exhibit improved tolerance to drought and salt stress

Market Overview

This overexpression of the micro RNA (miR319) gene improves salt and drought tolerance in transgenic plants, enhancing crop performance under adverse environmental conditions. Plant micro RNAs are a class of endogenous small noncoding RNAs that play essential roles in diverse biological processes, including plant responses to environmental stresses and various aspects of plant development. By harnessing the potential of these RNA, it's possible to improve the quality and safety of agricultural products impacted by abiotic stress such as drought and salinity. Clemson University researchers have cloned the rice miR319 gene and evaluated the feasibility of using this gene in turfgrass for improved plant response to abiotic stress. By manipulating mircoRNA 319 gene expression for enhanced abiotic stress resistance, there is great potential for enhancing crop performance under adverse conditions.

Application

Agriculture production; biotechnology

Stage of Development

Ready for field testing

Advantages

- Demonstrates increased tolerance to drought and salt stress, enhancing crop performance under adverse environmental conditions
- Utilizes an efficient method to produce plants that are capable of withstanding adverse environments, improving crop productivity with high efficiency

Technical Summary

Data demonstrates that transgenic plants overexpressing miR319 exhibit improved tolerance to drought and salt stress. In studies, transgenic plants overexpressing miR319 exhibited better water retention and cell membrane integrity than controls under salt stress. Additionally, transgenic plants accumulate less sodium than controls under salinity conditions. Overexpression of mi319 improves drought tolerance in transgenic plants that is associated with enhanced water retention and cell integrity and well-maintained photosynthesis.

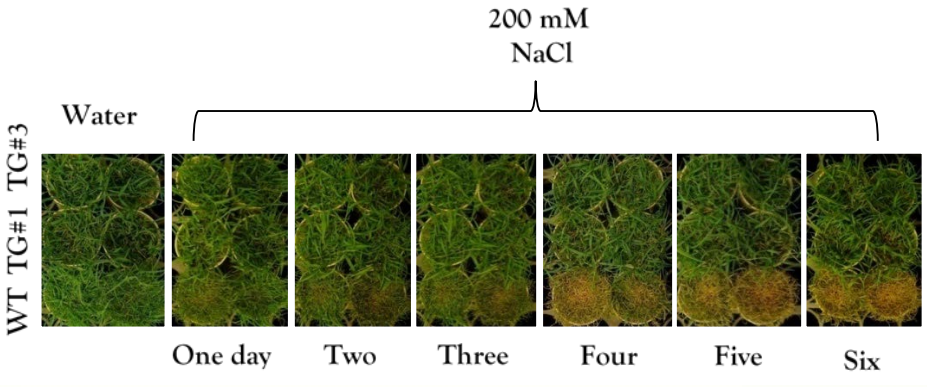
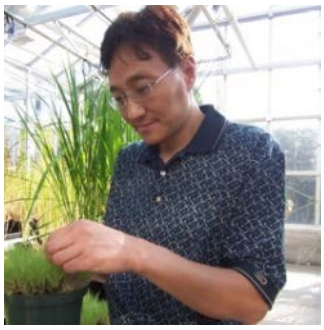


Figure 1: Data showing enhanced salt tolerance after six days of 200mM NaCl application to transgenic turfgrass plants with mircoRNA 319 gene expression.

App Type	Country	Serial No.	Patent No.	CURF Ref. Number	Inventors
Provisional Utility	United States	61/556,852 13/672,320	NA	2011-026	Hong Luo, Qian Hu, Man Zhou, Dayong Li

About the Inventor



Dr. Hong Luo is a Professor of Genetics and Biochemistry at Clemson University. He earned his Ph.D. in Molecular Biology from Catholic University of Louvain. Dr. Luo is the author of numerous publications and was the recipient of the 2013 Clemson University Godley-Snell Agricultural Award for Excellence in Agricultural Research. His research interests focus on transgenic plants and genomics.

For More Information

To learn more about this technology, please contact:

Chris Gesswein
Director of Licensing for Technology Transfer
agesswe@clemson.edu
(864) 656-3607