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Transgenic Creeping Bentgrass Plants with Enhanced Stress Tolerance (2014-070)

MiR396 Contributes to Enhanced Stress Tolerance under Adverse Environmental Conditions

Market Overview

Overexpression of the miR396c gene in transgenic creeping bentgrass allows for better control of plant flowering and enhances crop performance under adverse environmental conditions. Abiotic stresses such as drought, salt, and nitrogen deficiency are limiting factors for plant growth, development, and agricultural productivity. Therefore, it is critical to develop reliable procedures to genetically modify plants for improved performance under environmental stresses, thereby enhancing agricultural productivity to meet the ever-growing demands in food production. Clemson University researchers have discovered the key role miR396c plays in modulating plant growth, development and plant response to salinity and nitrogen deficiency. By manipulating the miR396c gene in plants, researchers could potentially improve plant abiotic stress resistance.

Application

Agriculture Production; biotechnology

Stage of Development

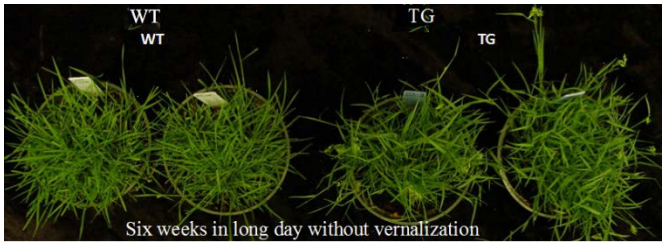
Molecular, Biochemical, and Physiological Analysis

Advantages

- Manipulation of the miR396c gene enhances plant stress tolerance
- Enhances crop performance under adverse environmental conditions, enabling better control of plant flowering and development

Technical Summary

Clemson University researchers have developed a transgenic creeping bentgrass plant using overexpression of Os-miR396c that alters plant development and improves stress tolerance to salt and nitrogen deficiency. Transgenic plants contain one or more genes which have been introduced artificially into the plant's genetic makeup using recombinant DNA technology. Examples of new traits in transgenic plants in food crops include resistance to pests, diseases, and/or environmental conditions. Plant microRNAs are a class of endogenous small noncoding RNAs that play essential roles in diverse biological processes, including plant responses to environmental and nutritional stresses and various aspects of plant development. Clemson researchers have cloned the rice miR396c gene and evaluated the feasibility of using this gene in turfgrass for trait modifications. The data demonstrates that transgenic plants overexpressing miR396c flowered under long day conditions without vernalization and exhibited enhanced stress tolerance.



Overexpression of miR396 in transgenic (TG) plants leads to plant flowering bypassing vernalization

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Utility Provisional	United States	62/063,779 14/883,350	NA	2014-070	Hong Luo, Shuangrong Yuan, Zhigang Li, Qian Hu

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

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