



UT9034

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A Broad Environmental Stress-Inducible Promoter and its Application in Crops

Increasing crop yields is of critical importance to farmers and companies around the world for both cost and productivity improvements. One of the ways to improve yields is to increase the ability for plants to withstand environmental stresses, such as drought and high or low temperatures. Researchers at the University of Tennessee have isolated a gene that will allow plants to tolerate environmental stresses and not adversely affect their growth in normal growing conditions.

The Technology

Researchers at the University of Tennessee's Institute of Agriculture have isolated a novel promoter sequence from *Populus* that is highly, yet broadly inducible by high temperatures (40°C), low temperatures (0°C), drought, and flooding. This promoter sequence has been cloned, and when expressed in *Arabidopsis*, has been shown to induce reporter gene function in all tissue types tested (root, leaf, seed pot and flower). Experiments are currently underway to test this promoter sequence in several other economically important crops.

Plant Performance Under Stress

whole plant	flower	seed pot	leaf	root

No Induction

High Temperature

Low Temperature

Drought

Flooding

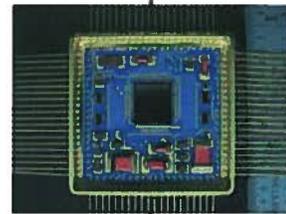
AGRICULTURE



BIOTECHNOLOGY



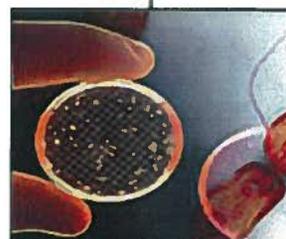
ENGINEERING



MATERIALS



MEDICINE





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Advantages

- Increases the ability of plants to survive environmental stresses, which will increase plant yields and profitability
- Expands the number of geographic locales in which some crops can be planted

Patents

One provisional patent application has been filed.

The Inventor

Dr. Max Cheng's research program focuses on two areas, genomics and molecular phylogeny, and the interface of molecular biology and plant breeding and growth and development of woody plants, particularly *Populus*. Current research focuses on three major areas. One is associated with *Populus* genomics and poplar genetic engineering for biomass energy production. The projects include transformation of aspen plants for increasing growth rate and for enhanced rooting from hardwood cuttings and understanding adventitious rooting mechanisms, genetic transformation of *Populus trichocarpa* Nisqually-1 for poplar functional genomics research, developing sterile poplar trees to reduce the environmental risk of the transgenic poplars, genetic engineering poplars for heavy metal phytoremediation, and characterization of poplar genome. Another major area of research is to employ biotechnology to neutralize the invasiveness of high-value ornamental plants with the goal to eradicate invasive plants.

Contact

The University of Tennessee Research Foundation (UTRF) is a non-profit corporation responsible for commercializing University of Tennessee technologies and for supporting University research. UTRF is seeking parties interested in learning more about this technology and in exploring possible research and/or commercialization arrangements.

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