CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
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Project Number
S1602

Project Title
Systemic Acquired Response and Mutant Vascular Tissue Patterns in Arabidopsis thaliana

Abstract

Objectives/Goals
Local infection with a pathogen can render plants to become resistant to normally virulent pathogens. This biological response is known as systemic acquired response (SAR). This study tested whether varying vascular tissue patterns in Arabidopsis thaliana will affect the plant's ability to respond to SAR when it is infected by a pathogen.

Methods/Materials
Several mutant vein patterns were stained and Mutants 33 and 117 were chosen. Arabidopsis plants were injected with avirulent Pseudomonas syringae (bacteria) on three lower leaves in the primary inoculation. Two days later, virulent Pseudomonas syringae was injected on three upper leaves in the secondary inoculation. After three days, the leaves were crushed, diluted, plated, and later counted under a sterile hood. This process was repeated with both mutant plant lines.

Results
Both mutants showed a tendancy towards developing a strong systemic acquired response resulting in lower bacteria counts, whereas the Columbia Wildtype plants (control plants) showed a tendency to develop more infections.

Conclusions/Discussion
The hypothesis seems to be correct. The proven theory is that dispersed vein patterns of the mutant plants favorably affected the plant's SAR to Pseudomonas syringae. These mutant vein patterns may result in higher crop yields.

Summary Statement
The dispersal of a mutant vein pattern may affect the ability of a plant to defend itself from pathogens when infected in one leaf.

Help Received
Used lab equipment at the University of California, Riverside under the supervision of Dr. Linda Walling, professor in the Department of Botany and Plant Sciences. Acquired Mutant vein patterns from Timothy Nelson (Yale University).