



Transgenic American chestnuts show enhanced blight resistance and transmit the trait to T1 progeny

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Background

- Dr. William (Bill) Powell (SUNY) is leading a team of researchers who are attempting to increase the resistance of American chestnut (*Castanea dentata*) to the virulent fungal pathogen (*Cryphonectria parasitica*) that causes chestnut blight. The team is leveraging metabolomics research capabilities within the DOE PMI Science Focus Area at ORNL to validate the effects of transgenesis, ensure biosafety, and characterize disease resistance responses.

Science

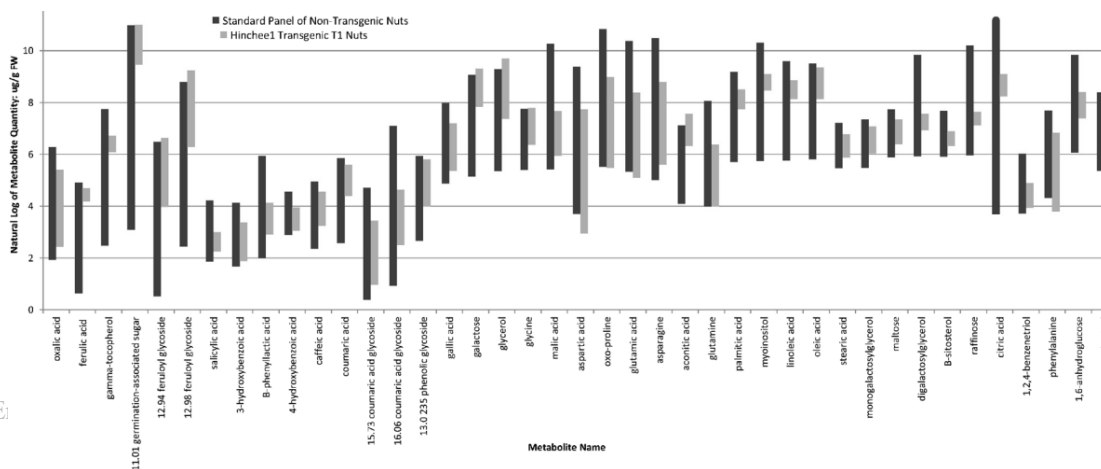
- The 'Darling4' transgenic is intermediate in resistance between susceptible American and resistant Chinese chestnut.
- Stem and leaf assays both show enhanced blight resistance due to the two transgenes (oxalic acid oxidase and ESF39, an antimicrobial peptide) in transgenic American chestnut trees. These genes have been transmitted to the T1 generation, which have shown similarly enhanced blight resistance.
- Metabolomic analyses indicate that concentrations are within the range observed for a panel of control plants and that the nuts of transgenic chestnut plants are likely safe for consumption.

Significance

- The results of this study represents a major step toward the restoration of the majestic American chestnut.

Range comparison of metabolite values in non-transgenic and transgenic nuts

Newhouse, Andy, et al. In Press. *Plant Science*. DOI (10.1016/j.plantsci.2014.04.004)



Chestnut blight lesion size

