

Final Report

Title:	Functional Genomics of Heartwood Formation in Black Walnut		
Sponsoring Agency	NIFA	Project Status	COMPLETE
Funding Source	Mcintire Stennis	Reporting Frequency	Final
Accession No.	199031	Project No.	IND011549MS
Project Start Date	10/01/2008	Project End Date	09/30/2013
Reporting Period Start Date	10/01/2008	Reporting Period End Date	09/30/2013
Submitted By	Christy Rich	Date Submitted to NIFA	02/13/2014

Project Director

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Recipient Organization

SAES - PURDUE UNIVERSITY

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Performing Department

Forestry & Natural Resources

Non-Technical Summary

Black walnut is an extremely valuable hardwood tree that has, at the population level, significant genetic variation with regard to sapwood production, having as few as three and as many as 20 annual rings of sapwood. Highly colored and durable heartwood is one key determinant of black walnut's value and appeal. Currently, it is possible to convert sapwood into something that resembles heartwood by steaming ("cooking") black walnut lumber. However, this treatment is extremely labor- and cost-intensive. Genetic manipulation of heartwood formation may make it possible to shorten harvest rotations and reduce lumber-production costs. In this project, we will continue to explore ways to minimize sapwood and maximize heartwood formation. Our goal is to identify genes that are associated with the transition from sapwood to heartwood. Eventually, this research will allow the Indiana furniture-making industry to be more competitive globally.

Accomplishments**Major goals of the project**

1) Evaluate functionality of candidate walnut genes in *Arabidopsis thaliana*; 2) Introduce candidate genes into cambial sectors of greenhouse-grown walnut and poplar; 3) Produce transgenic walnut and poplar plants with altered expression of most the promising candidate genes; and 4) Conduct greenhouse and field tests using trees transformed with candidate transgenes.

What was accomplished under these goals?

All of the stated goals.

What opportunities for training and professional development has the project provided?

{Nothing to report}

How have the results been disseminated to communities of interest?

Yes, via a refereed publication.

What do you plan to do during the next reporting period to accomplish the goals?

{Nothing to report}

Participants

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Actual FTE's for this Reporting Period

Role	Non-Students or faculty	Students with Staffing Roles			Computed Total by Role
		Undergraduate	Graduate	Post-Doctorate	
Scientist	0.9	0	0	0	0.9
Professional	3.2	0	0	0	3.2
Technical	0	0	0	0	0
Administrative	0	0	0	0	0
Other	7.5	0	0	0	7.5
Computed Total	11.6	0	0	0	11.6

Student Count by Classification of Instructional Programs (CIP) Code

{NO DATA ENTERED}

Target Audience

The scientific community and practitioners in the field.

Products

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Accepted	2013	NO

Citation

Huang, Z., Zhao, P., Medina, J., Meilan, R, and Woeste, K. 2013. Roles of JnRAP2.6-like from the transition zone of black walnut in hormone signaling. PLOS ONE (accepted).

Other Products

{Nothing to report}

Changes/Problems

{Nothing to report}