Genetic and Phenotypic Characterization of Figured Wood in Poplar

Yoursan Fan1,2, Keith Wottle1,2, Daniel Cassens1, Charles Michel1,2, Daniel Szymanski3, and Richard Meilan1,2

1Department of Forestry and Natural Resources, 2Hardwood Tree Improvement and Regeneration Center, and 3Department of Agronomy; Purdue University, West Lafayette, Indiana 47907

Abstract
When “Curly Aspen” (Populus canescens) was first characterized in the early 1940s, it attracted the attention of the wood-products industry because “Curly Aspen” produces an attractive veneer as a result of its figured wood. Birdseye, fiddleback and quilt are other examples of figured wood that are commercially important. Of the 15 SSR primer pairs tested, three have been shown to be polymorphic. Others are now being tested. The reasons researchers investigating the formation of figure have not made more progress include the: 1) long juvenile period of trees, 2) inability to identify figure without cutting open a log, and 3) lack of genomic resources. The current research project is focused on: 1) investigating the development of figure using marker-aided cloning. The ultimate goal is to transform the gene responsible for eliciting figure into fine hardwood species.

Materials and Methods
Genetically engineer commercially important trees to form figure.

Establish a segregating population (~2,000 individuals) using “Curly Aspen” (Populus canescens) as the male parent.

Use pollen from “Curly Aspen” to fertilize a P. alba female (Figs. 6, 7).

Isolate responsible gene(s).

Future Work
1) Screen more SSR primers to identify 20 polymorphic markers.
2) Conduct waving-ross assay on 2,500 germinating seeds from our segregating population.
3) Ascertain the genetic basis for figure in mature wood.
4) Determine the age at which figure can be reliably detected in offspring.
5) Test various environmental factors for their influence on figure initiation.

Acknowledgements
This project is partially funded by a generous donation from Dr. Samuel Grober. Additional support was provided by the USDA. We are also grateful to Dr. John Seabrook and Patrick Masson for providing Arabidopsis seed. We appreciate the technical assistance provided by Jim McKeina, Carl Huetteman, Brian Beheler and Bill Shrubett.

References
4) Photographs for Figures 1-5 obtained from Carl F. Booth & Co. LLC.