

Project Title: Defining levels of TCD susceptibility/tolerance within eastern black walnut

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Results from Previous Work:

- Collaborations began with Dr. Ned Tisserat at Colorado State University (CSU) in 2009 to begin screening of black walnut (BLW) seedling and clonal germplasm for TCD susceptibility.
- All screening work was conducted in the greenhouse using Ned's inoculation protocols.
- Limited data obtained to date suggests the presence of significant levels of genetic variation in TCD susceptibility/tolerance.

Objective of Current Research:

- To increase our level of understanding of the potential genetic variation in TCD susceptibility/tolerance that exists within BLW.

Research Approach:

- Additional screening trials will be established in the eastern U.S. (using both clonal and seedling accessions).
- To date, field trials have been established in PA, TN and VA, using seedling sources from 9 different states. These trials will help to address the effects of geographic origins on TCD susceptibility/tolerance, in the presence of the walnut twig beetle (WTB) which vectors the disease.

Future Directions:

- Define the genetic basis for TCD susceptibility/tolerance within BLW through screening of 15 full sib populations (plus parents) in both the field and greenhouse.
- Screening of these populations will facilitate the development of genetic markers (called quantitative trait loci, or QTLs) associated with TCD tolerance.
- Such markers will then be positioned within a BLW genetic linkage map currently under development.
- Long term, these QTL markers will be utilized to enable both applied breeding programs for TCD resistance, as well as quantify potential levels of TCD susceptibility/tolerance within native BLW populations.