Genetics of Resistance to *Phytophthora cinnamomi* in Chestnut

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Phytophthora cinnamomi is the causal agent of ink disease, a deadly root-rot in susceptible chestnut trees. Finding non-lethal methods of selecting Phytophthora- resistant parent trees is emerging as an important issue to The American Chestnut Foundation. Current research involves using molecular genetic markers to verify the type of inheritance of Phytophthora resistance in chestnut and to develop a map of the resistance locus(i). If successful, this work will yield a reliable, non-lethal method of identifying Phytophthora-resistant seedlings; this knowledge is needed to design and implement resistance screening strategies aimed at developing breeding lines of American chestnut (*Castanea dentata*) that are resistant to both blight (caused by *Cryphonectria parasitica)* and Phytophthora.

Preliminary results using controlled inoculations of greenhouse-grown seedlings with *P. cinnamomi* suggest that Chinese chestnut (*Castanea mollisima*) is resistant while American chestnut (*C. dentata*) is largely susceptible. Interspecific F1 hybrids are also resistant indicating that genetic control of resistance is dominant. Resistance segregation patterns in B1 and B1-F2 crosses suggest control by a single locus; however, sample sizes to date have been relatively small. Results have also suggested that the genes for resistance to *P. cinnamomi* and *C. parasitica* are not closely linked. Screening and genetic analysis of two related B1 crosses in the Chinese 'Mahogany' line are currently underway (KY 115 x WB 348 and KY 117 x WB 348). Polymorphic AFLP bands that segregate with resistance will be used to map the resistance locus(i).