SCREENING FOR *PHYTOPHTHORA CINNAMOMI* IN RECLAIMED MINED LANDS TARGETED FOR AMERICAN CHESTNUT RESTORATION PROJECTS

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ABSTRACT

We are working toward restoring the American chestnut in southeastern Ohio, which was once part of the tree's natural range. Some of these lands have been severely affected by excessive mining operations for several decades. Therefore, we are planning and testing use of ectomycorrhizal fungi in the restoration efforts. Mycorrhizal fungi may play a vital role in this, because they have been shown to be essential for the survival of seedlings by supporting growth under a variety of subnormal soil and other stress conditions. Our work has identified several species of ectomycorrhizal fungi that form associations with chestnut seedlings. We are testing their utility in restoration efforts.

Long before the chestnut blight fungus was introduced, other pathogens of the genus *Phytophthora* were introduced in the late 1700s or early 1800s. Among these, *Phytophthora cinnamomi* was responsible for the "ink disease" or "root-rot" that resulted in the widespread death of chestnut trees in the southern states. Its presence in the northeastern states, and especially in the Appalachian region, was recently noticed on chestnut seedlings. This could be detrimental to the planned reforestation and restoration efforts.

We tested soil from several locations where we have planted and/or are planning to plant hybrid chestnut trees inoculated with mycorrhizal fungi. All these locations are coal mined areas that have been reclaimed. Soil was collected at a depth of 4 to 5 inches, placed in plastic zip lock bags, and stored at 22^{o}C in the dark until used. A variation of soil dilution plating method was used to assay for *P. cinnamomi*. A positive control containing ~4 cfu/10 g soil was used in the analysis. After identifying the fungus morphologically, we used molecular methods (PCR using species-specific primers) to confirm that the fungus was indeed *P. cinnamomi*.

Our results showed that, at least in the locations we tested, *P. cinnamomi* was not present. It is possible that because most of these lands were only recently reclaimed, the fungus may not have established there yet. However, samples from locations that were reclaimed more than a decade ago also showed absence of this fungus. We will continue monitoring these and other locations marked for future chestnut plantings. It is noteworthy that the Chinese chestnut is resistant to *P. cinnamomi,* and recent findings have shown that hybrid chestnut trees (the ones we plant) are partially to reasonably resistant to the fungus.