

The Reintroduction of the American Chestnut

Understanding Chestnut Ecology Will Aid Restoration Efforts

by Dr. Stacy Clark

Successful reintroduction of the American chestnut will require far more than blight resistance. The greatest challenge will be the ability of blight-resistant seedlings to survive and reproduce in a forest that presents both native and non-native threats.

In 2007, the United States Department of Agriculture, Forest Service (USFS), The American Chestnut Foundation (TACF), and The University of Tennessee (UT) began collaborating on chestnut restoration research on national forest land. Over the ensuing years TACF provided material to the USFS for the establishment of eleven field plantings that included 4,596 trees, 2,022 of which were the first potentially blight-resistant seedlings (B_3F_3 generation, Restoration Chestnuts 1.0). (*This represents only one segment of the total forest and progeny testing undertaken by TACF that currently numbers over 10,000 B_3-F_3 seedlings.* – Ed).

We predicted that the most important factors for reforestation success would be the ability of the seedling to: (1) compete with natural rivals like tulip poplar (*Liriodendron tulipifera*), (2) overcome deer browse pressure, and (3) have enough resistance to survive the blight.

At four of the planting sites, chestnuts have had high survival (75 percent) and are growing one foot in height per year. It is still too early to test for blight resistance, but after three growing seasons, we have determined that initial seedling quality is of utmost importance to establishment success. The tallest trees planted are staying above competition and deer browse. These results indicate that the future of restoration will require high-quality seedlings at the time of planting. Competition control using herbicides will also be essential on the sites with dense natural vegetation that can crowd out the planted chestnuts.

At seven planting sites, we discovered other factors that are hampering restoration success. Survival is relatively low (59 percent) in these plantings due to root rot caused by an exotic fungus, *Phytophthora* spp. The



University of Tennessee technician, John Johnson, measures a three year old chestnut in a national forest planting. The chestnut is the same height as the pole.

Photo by Dr. Stacy Clark

future of chestnut restoration in the southern United States, where this pathogen is present, will require that seedlings for planting be grown using soil and water free of the disease fungus (e.g., containers), and planting on sites that do not have the disease (e.g., previously uncultivated land). Other exotic pests affecting seedlings included the Asiatic oak weevil (*Cyrtopistomus castaneus*) and the Asian gall wasp (*Dryocosmus kuriphilus*). These species could have negative impacts on chestnut restoration, and there are currently no adequate control methods for them. Native pests may also take their toll, including cicadas, which severely damaged one planting.

In planning for the future of chestnut restoration, an integrated approach will be essential. Success will require a balance among good seedling quality, follow-up competition control, testing for resistance, and forest management practices to control native and non-native pests and pathogens, including blight.

Stacy Clark is a Research Forester with the Southern Research Station in Knoxville, TN. She received her Ph.D. in Plant Science from Oklahoma State University. Her primary research interests are American chestnut restoration, artificial regeneration of oak, and forest succession.