

PROGRESS REPORT for TACF

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TITLE OF RESEARCH PROJECT: Habitat Preferences of American Chestnut in an Appalachian Cove Forest

SUMMARY OF RESULTS AND CURRENT STATUS (January 1, 2014 – June 21, 2016):

In the first phase of this experiment, 400 seeds of chestnut hybrids (BC3-F3) were planted within small and large gaps in a cove ecosystem in West Virginia in March 2014. This began by creating eight gaps of two sizes (~ 40% light and ~60% light) in an Appalachian cove forest in north-central West Virginia. Deer fences (8 ft in height) were constructed at the center of each gap. Landscape fabric was placed on every other row of planting locations to experiment with competition in a forest environment. Seeds were planted at a depth of 1 inch in 6 inch holes filled with sphagnum moss. Each seed was protected by a conical tube (3 inches in diameter, 10 inch aluminum flashing, smaller at the top, sunk 2 inches into the soil). We selected this method because of the lateral branching pattern of American chestnuts, ability to plant earlier in the spring, cost considerations, and ease of installation. Germination rates were high (> 85%). However, seedling mortality was very high (>90%) within several weeks of removing the paper cups. Mortality was due to rodents (most likely chipmunks), which entered the narrow top opening of the aluminum cones.

In the second trial of this experiment, we planted 50 Restoration Chestnut 1.0 container seedlings within the same plots in March 2015. In each plot, half the seedlings were planted within landscape fabric to quantify the effect of herbaceous competition. We randomly placed 12'' tree shelters around half of the seedlings to quantify the effect of rodent girdling on growth and survival. After one growing season, chestnut survival across all plots was 91%. Seedlings in large gaps were significantly taller (mean = 48.99 cm) than those grown in small gaps (mean = 46.29 cm) ($p=0.035$). Landscape fabric and canisters had no effect on measured growth variables. We predict that in subsequent growing seasons, the overall height of chestnuts in large gaps will suffer due to more intense competition or physical crushing by *Rubus spp.* Continued monitoring is critical to understand how these trees will respond to different management treatments as they grow beyond the seedling stage.