Abstract

The American Chestnut tree (Castanea dentata) was a keystone species in the Appalachian Forest once numbering as many as one in every third tree. Since the accidental introduction of the Chestnut Blight (Cryphonectria parasitica), this iconic tree has become functionally extinct as efforts to stop the spread of the fungus have failed. Efforts to create a Chinese/American hybrid tree that can replace the lost American Chestnut have been ongoing, the goal being to have a tree with American form but Chinese resistance to the blight. Our research seeks to identify the most effective forest management strategies for these hybrids to help ensure their success in a forest setting.

Methods

One-year-old container seedlings of Restoration 1.0 chestnuts were planted within 8 plots. Seedlings were spaced 1 meter apart. The American Chestnut tree (Castanea dentata) was a keystone species in the Appalachian Forest once numbering as many as one and every third tree. Since the accidental introduction of the Chestnut Blight (Cryphonectria parasitica), this iconic tree has become functionally extinct due to this fungal disease.

RESULTS

Four plots were within large gaps (~60% canopy openness) and four plots within small gaps (~40% canopy openness) on the southwestern slope at an elevation of ~800m. Within each plot, landscape fabric was applied to every other row, and half of the seedlings were randomly selected to receive 12'' tree shelters. Height (cm), diameter (mm), and survival were recorded at the end of every growing season (2015–2018). Binomial regression was performed to determine if treatments affected survival.

CONCLUSIONS

Four year old chestnut saplings had the greatest growth (diameter) and survival in small gaps (Figure 2 and 3). Increased survival (70% compared to 40%) and diameter size could be due to less competition with Rubus spp and other herbaceous and woody shrub and tree species that compete well in higher light conditions.

Smaller gaps may also harbor less small mammal predators due to less dense vegetative cover. The combination of landscape fabric and high vegetation cover in large gaps may have negatively affected seedling survival in large gaps after four years. Tree shelters did not prevent this predation because some rodents were tunneling under the shelters.

The general trend for better survival, height, and diameter in small gaps suggests that restorative plantings should be done there.

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