

Section 4 Abstracts: Ecology and Genetics of the Chestnut Blight Fungus

Ecology of Chestnut Blight, Hypovirulence and American Chestnut Survival in Appalachian Forest Clearcuts and Plantation. Gary Griffin,¹ H. Clay Smith,³ John Elkins,⁴ M.A. Khan,² S.L. Griffin,¹ Frederick Hebard² and R.W. Wendt². ¹Presently or ²Formerly with Department of Plant Pathology, Physiology and Weed Sciences, Virginia Tech, Blacksburg, VA 24061; ³USDA Forest Service, Parsons, WV 26287; and, ⁴Division of Natural Sciences, Concord College, Athens, WV 24712, USA

Following clearcutting in Appalachian forests, American chestnut sprouts vigorously and grows as rapidly as any competing hardwood. Blight incidence is initially low (<20%) in clearcuts, but an epidemic of chestnut blight follows chestnut growth, reaching high levels of incidence (75%-100%) 9 to 10 yr after clearcutting. On mesic sites, no survival of chestnut sprout clusters was found 13 to 19 yr after clearcutting, but low (34%) to high (100%) survival was found on xeric sites. Clearcuts with a high survival of chestnut had low stand basal areas for competing hardwoods, and vice versa. Irradiance levels were higher along transects and at the base of chestnut stems in xeric clearcuts with high chestnut survival, than in mesic clearcuts with no chestnut survival. Removal (management) of competing hardwoods in clearcuts resulted in increased chestnut survival, growth and development of non-lethal, superficial blight cankers. Similar but greater growth and superficial canker responses were observed in an American chestnut plantation. Hypovirulent strains of the chestnut blight fungus were found in clearcuts previous to the peak of the epidemic, but superficial cankers typically increased after the epidemic peak in managed clearcuts. Hypovirulent strains of the fungus containing dsRNA were associated with superficial cankers in managed clearcuts and the plantation. An ecological succession of chestnut growth, blight increase and hypovirulence development may occur in managed clearcuts. Mites harbored hypovirulent and virulent strains of the fungus and may be involved in fungal dissemination.