

A Multi-state Collaborative Effort to Conserve Butternut *Ex Situ*¹

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Butternut (*Juglans cinerea*), a native riparian forest tree, has suffered significant decline throughout most of its range due to a fatal fungal disease, butternut canker (caused by *Sirococcus clavigignenti-juglandacearum*). It has also been subject to natural hybridization pressures from Japanese walnut (*J. ailantifolia*), first introduced to North America ~1850. Butternut is now listed as a “species of concern” in Canada and similarly classified in several states of the United States. Previous experience indicates site-related shifts in fitness for Japanese walnut × butternut hybrids compared to “pure” butternuts. The presence of at least putative “tolerance” to butternut canker in some butternuts resulted in the establishment of a multi-state effort to restore this species by establishing a series of *ex situ* germplasm collections in the northeastern United States. Both nuclear and chloroplast markers developed at the University of Notre Dame were used to define the hybrid status of 1400+ individuals across 48 sites, representing 17 states plus two Canadian provinces. The proportion of hybrids found in this survey averaged 17 percent, but this percentage varied greatly across sites, with more hybrids occurring near farms and/or agricultural fields than in forested areas. From 2009 to 2014, non-hybrid individuals that also exhibited some level of tolerance to butternut canker were identified in Iowa, Missouri, Pennsylvania and Vermont. Dormant scions were collected and grafted on black walnut (*J. nigra*) seedling rootstocks at the University of Missouri. Similar propagation efforts were also undertaken in Indiana using locally-sourced scions. Successful grafts have been outplanted as clonal gene banks/seed orchards in Indiana, Missouri, Pennsylvania and Vermont, established by the Indiana Department of Natural Resources, University of Missouri, Pennsylvania Bureau of Forestry, and Vermont Department of Forests, Parks and Recreation, respectively. In addition, a clonal population representing accessions from five states was established by the Connecticut Agricultural Experiment Station near Windsor, Connecticut to serve as a source of diverse germplasm for use in future butternut canker screening trials.

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