

From Forest to Freezer: a Comprehensive Seed Collection of the Kentucky Coffeetree, *Gymnocladus dioicus* (L.) K. Koch¹

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Kentucky coffeetree, *Gymnocladus dioicus*, is a picturesque shade tree adaptable to urban conditions and drought, with no serious insect or disease problems. These traits make *G. dioicus* a promising candidate among diverse tree genera to replace ash (*Fraxinus*) trees affected by the emerald ash borer (*Agrilus planipennis*) or oaks (*Quercus*) being affected by oak wilt (caused by the fungus *Ceratocystis fagacearum*) within our cities. In nature, Kentucky coffeetree comprises only a small percentage of forested systems across the Midwest, warranting the assembly of an *ex situ* germplasm collection.

Collaboration between The Brenton Arboretum and the North Central Regional Plant Introduction Station has resulted in the acquisition and preservation of one of the most comprehensive *ex situ* woody plant seed collections represented in the United States National Plant Germplasm System and an extensive *G. dioicus* living plant collection at The Brenton Arboretum. To date, 80 georeferenced sites in 12 of the 14 states within the core native range of *G. dioicus* have been sampled. Targeted sites were systematically selected focused on Omernik Level III Ecoregions followed by geographic gaps. This targeted approach along with the sampling of multiple genets within a population strives to ensure the assembly of a genetically heterogeneous collection adaptable to a wide-range of climatic factors. Our efforts have documented the natural occurrence of this species along with its habitat and associated vegetation, soil type, plant health, rarity, and regeneration.

These collections will provide a foundation for research on genetic diversity, the potential to select elite lines for use in managed landscapes, and allow selection of specific seed sources to be utilized in restoration projects. Our firsthand knowledge of these genetic resources will help with restoration and management efforts of *G. dioicus* in forested ecosystems, strengthen risk assessment surveys, and demonstrate the importance of gene banks and arboreta in the conservation of tree genetics.

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