



The Transgenic American Chestnut Tree



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About the American Chestnut Tree

The American chestnut was an ecologically, economically, and culturally important tree species in the eastern United States. In the late 1800s, the introduction of the chestnut blight fungus from Asia decimated over 4 billion American chestnuts. Today, this iconic species rarely reproduces on its own in the wild and is therefore functionally extinct.

About Rescue and Restoration Efforts

The American Chestnut Foundation (TACF) is leading an unprecedented mission to restore the American chestnut tree to its native range. By employing complementary methods of traditional breeding, [biotechnology](#) and biocontrol, TACF works to create a disease tolerant and genetically diverse population of American chestnut. Working in close collaboration with TACF, the State University of New York College of Environmental Science and Forestry ([ESF](#)) leads the biotechnology research and testing efforts. Biotechnology, particularly transgenics (i.e. introducing genetic material across species in order to safely create desired traits - such as blight tolerance), has proven to be one of the most successful methods for generating blight-tolerant American chestnut trees that retain their full complement of traits for adaptation and ecosystem services in our forests.

About the Transgenic Darling 58 American Chestnut Tree

ESF has developed a revolutionary transgenic American chestnut tree with enhanced blight tolerance: **Darling 58**. The blight tolerance of the Darling 58 tree is a result of inserting a gene from wheat called [oxalate oxidase \(OxO\)](#). The OxO gene detoxifies the acid produced by fungus and prevents lethal cankers on the tree, essentially allowing the tree to coexist with the blight pathogen. ESF researchers carefully chose the OxO gene because it is well understood, commonly found in nature as a defense against pathogens, and because there has been no evidence that the enzyme is harmful to human or animal health, the environment or is a plant pest risk. Darling 58 chestnut trees retain 100% of their natural genes, producing the closest form to wild American chestnuts. It is imperative, however, that these trees are bred with wild-type American chestnut trees to diversify the population and provide regional adaptation.

The Future of the American Chestnut Tree

ESF has submitted a petition to the United States Department of Agriculture's office of Animal and Plant Health Inspection Service (USDA-APHIS) to request that Darling 58 be granted "nonregulated" status. Petitions to two other agencies (EPA and FDA) will be submitted soon. If granted, this will move us one significant step closer to the goal of ecological restoration of the American chestnut. Nonregulated status will mean that Darling 58s and their offspring can be distributed and planted like wild-type or traditionally bred chestnut trees in unrestricted areas. This would help ensure the survival of the American chestnut by transferring blight tolerance traits to its transgenic offspring, including surviving wild-type trees from across the chestnut's native range. Ultimately, this process will safely produce a resilient and diverse restored population and allow the American chestnut to be conserved far into the future.

More about the regulatory review process and the public comment period can be found on [TACF's website \(acf.org/resources/deregulation-darling58\)](#).