

Restoration of the American Elm in Ohio and the Eastern United States

The Forestry Sciences Laboratory, Northeastern Research Station, initiated a project in 2003 to restore the American elm in the state of Ohio. American elm tree strains with high levels of tolerance to Dutch elm disease were established in areas where the trees can naturally regenerate and spread. The process of regeneration will allow the American elm to co-evolve with the DED fungal pathogen to ensure this valuable tree species will not be lost from the American landscape. This effort is being carried out in partnership with the Ohio Department of Natural Resources Division of Forestry, Franklin County Metro Parks, and The Wilds.

We would like to expand the restoration effort beyond Ohio to the former range of the American elm in the Eastern United States. This goal can only be accomplished through partnerships with state agencies, municipalities, environmental groups, etc.

History of the American elm:

The American elm was once widely distributed throughout the eastern United States and was a preferred tree for use along city streets and in the yards of many homeowners. The Dutch elm disease fungal pathogen *Ophiostoma ulmi* was introduced into the United States in 1930 and in the subsequent years has destroyed millions of American elm trees in the United States and Canada. By 1976 only 34 million of the estimated 77 million elms present in urban locations before introduction of the DED pathogen remained, and far fewer are still present today.

The American elm's tall height coupled with its vase-like shape provides for a uniquely graceful tree that was a favorite tree used for planting along city streets and boulevards. The crowns of mature elms would span roadways, houses, and park recreation areas and provide the benefits of cleaner air and cooler temperatures. The American elm is one of few trees known that is capable of growing relatively well within the harsh urban environment of high summer temperatures, air pollution, and road salt present in northern latitudes.



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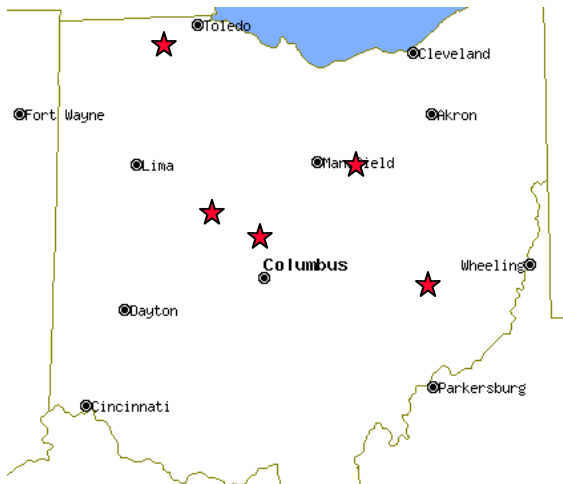
Research on the American elm from the 1970s to present focused on the identification of American elm isolates that could withstand the DED pathogen. Over 100,000 American elm trees were tested for resistance to Dutch elm disease. No trees were found that were resistant to DED; however, a few were identified that exhibited good levels of tolerance to the disease. A resistant tree would show no DED symptoms after injection of the fungus, whereas tolerant trees show disease symptoms the year of inoculation but no symptoms the next year. Some branches die after fungal injection, but are replaced after a couple of years. Out of over 100,000 American elm trees screened for DED resistance, five trees were identified that exhibit the necessary levels of DED tolerance to

withstand the disease. These five selections were used for the restoration effort

Retention of the American elm into the future:

The identification of DED tolerant American elms allows for the reintroduction of the American elm into urban areas. However, no effort is currently underway to restore the American elm into forested landscapes in the Eastern United States. In addition, and most importantly, only two individual American elm selections are primarily being used to reintroduce the elm into urban landscapes. The problem with this approach is that when the DED fungus mutates to a form that can overcome the tolerance mechanism in these two elm selections the disease will once again cause the loss of the American elm. It's not a matter of whether this will occur but when, since the DED fungus will continue to evolve while street trees will not since they do not propagate themselves. The American elm restoration project will allow the most DED tolerant American elm trees identified to date to propagate, evolve, and develop mechanisms that can withstand new forms of the DED fungus. This project will ensure the retention of the American elm in forested landscapes and will provide future trees that are tolerant to new forms of DED for use in urban settings.

Sites for the project:



Mohican State Forest, Ashland County; and Maumee State Forest, Henry County in partnership with ODNR, Division of Forestry

Highbanks Metro Park, Delaware County; Glacier Ridge Metro Park, Union County in partnership with Metro Parks

The Wilds, Muskingum County, in partnership with The Wilds

Establishment of American elm restoration Sites:

The first American elm restoration site was established at Highbanks Metro Park on June 16, 2003. The Mohican State Forest site was established June 18, 2003, the site at The Wilds on September 18, 2003, the Maumee State Forest Site on July 21, 2004, and the Glacier Ridge Metro Park site on September 9, 2004.

For information contact: Jim Slavicek, Project Leader and Research Biologist, USDA Forest Service, Forestry Sciences Laboratory, 359 Main Road, Delaware, Ohio 43015. Voice, 740-368-0033; fax, 740-368-0152; e-mail, jslavicek@fs.fed.us.