

USDA Forest Service Botany in the News

American Elm Restoration on the Chippewa National Forest

Who (*partners*): The Chippewa National Forest is initiating a project in 2007 to restore the American elm to the Forest's landscape. Seedlings from crosses of native American elm trees with American elm strains with high levels of tolerance to Dutch elm disease will be established in areas where the trees can naturally regenerate and spread. The process of regeneration will allow American elms with genetic DED tolerance to co-evolve with the exotic DED fungal pathogen (*Ophiostoma ulmi*), to ensure this valuable tree species will not be lost from the Forest's landscape. Partners in this effort are Northern Research Station, Delaware, OH; Northern Research Station, Grand Rapids, MN; State & Private Forestry, St. Paul, MN; State of Minnesota, and Leech Lake Band of Ojibwe.

What (*species*): American elm (*Ulmus americana*).

When: 2007 and beyond.

Where: Chippewa National Forest

How: During the summer of 2007, known large living "wild" American elm on the Forest will be field examined to ensure they are still alive, and their ages will be determined. Currently seven individuals have been identified. A team of biologists and silviculturists will select ten potential planting sites. These will be one acre in size and located in natural plant communities where American elm occurred historically.

Since none of the known tolerant cultivars are from latitudes as far north as the Chippewa National Forest, cold hardiness may be an issue. During the winter of 2007–2008, branch material from the known large trees that have been field examined will be collected and sent to the Northern Research Station in Delaware, Ohio. There the branches will be forced into bloom and then cross-pollinated with trees known to possess high tolerance to DED. The seed produced from these crosses will be sown and grown. Some of the resulting seedlings should possess both cold hardiness and disease tolerance characteristics.

During the summer of 2008, ten selected sites on the Forest will be prepared for planting the following spring. This may include the

removal of existing woody vegetation depending on the current condition of the sites.

In the Spring of 2009, seedlings will be shipped from Northern Research Station in Delaware, Ohio, to the Chippewa NF where they will be out planted. Fencing will be required for every tree to protect them from deer predation and rubbing, which can destroy these trees. A minimum of two hundred trees will be needed.

The Northern Research Station in Grand Rapids, Minnesota, coordinating with Delaware, Ohio, will conduct long term monitoring. Young trees that die will be replaced through time as to maintain fully stocked plantings of at least 20 trees on each one-acre site. Once established these trees should cross-pollinate with each other and with other wild trees, strengthening the genetic tolerance to DED in the native population over time.

Why: There are 5 individual American elms that have been identified as being tolerant to DED. With crosses between these, there are about 10 cultivars known to be tolerant. When infected, these trees are able to overcome this non-native fungus disease and continue to grow and remain healthy. One cultivar, "Princeton", possesses outstanding horticultural characteristics and is easily reproduced. Home Depot is currently propagating it for distribution.

The narrow genetic base being introduced to urban areas may eventually be overcome by evolution of the disease. As the fungus mutates, a form may eventually develop that can overcome the defenses of these now tolerant cultivars. In contrast, the wild landscape has a broad genetic base and is free to regenerate. This will allow natural selection also to occur in the American elm species, providing an opportunity for it to adapt to changes in the disease.

Low levels of tolerance exist in the wild. The objective of this project will be to strengthen the tolerance to DED in the landscape of the Chippewa National Forest without narrowing the genetic base of the remaining elm population. It is hoped this effort will hasten the process of natural selection for resistance, and a return of the American elm component in the landscape of the Chippewa National Forest.

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American elm - quintessential America