



Potential Loss of Butternut from Iowa's Forests

Butternut trees produce valuable wood products used for years by carpenters for cabinets, flooring and furniture. It is a softer wood than black walnut, making it easier for woodworkers to shape and carve into products. Butternut grows on a variety of sites, doing best on well-drained soils in riparian areas and is native to the eastern ½ of Iowa, living up to about 80 years. Like black walnut and oak, it is intolerant of shade, so silvicultural regimes that are suitable for oak and black walnut are appropriate for butternut. Butternut produces seed that is desired by people and many different forest wildlife species.

During the past 40 years, a disease called *Sirococcus clavignenti-juglandacearum* (butternut canker) has spread throughout the northeastern United States. The spores of the fungus are spread by rain splash and wind, but the rapid spread of the disease suggests that insects also act as vectors. Dr. Dale Bergdahl and his colleagues have found that at least 17

species of beetles closely associated with butternut that can carry spores of the disease. A single beetle can carry as many as 1.6 million spores (just one is needed to cause an infection) and the spores can remain viable on insects for at least 16 days. The fungus can also be carried on the nut; causing some trees to be infected before they even begin to grow.

There is no known treatment for the butternut fungus, so conservation efforts are focused on finding and protecting resistant trees. A challenge associated with planting more butternuts is determining if the trees are genetically pure. Butternuts can hybridize with other trees like Japanese walnut, which was introduced into North America in the 1800's.

Status of Butternut in Iowa

In 1990 Iowa had an estimated 1.4 million butternut trees; by 2008 an estimated 84,000 trees remain (94% drop). There has not been any effort to date to determine how many of the 84,000 or so remaining trees are native butternut. There are some physical characteristics that can be used to distinguish between a native butternut and a hybrid, but it is usually difficult when looking up into the canopy of a mature tree in a forest setting. The trees we are finding in Iowa are being tested using DNA analysis to determine which trees are hybrids and which are native.



A Rare Mature Butternut in a Forested Area.

Iowa is in a unique position with respect to the North American butternut range. The eastern half of the state is in the natural range of butternut and the western half is outside of the naturally occurring range.

What are we doing?

The U.S. Forest Service has made selections of native butternuts throughout the northeastern U.S. over the past 20 years. Branches (scion) are collected from these trees to capture the exact genetics of these desirable trees. Scion has been grafted onto black walnut root stock to help create seed orchards that can produce more seeds to maintain a viable population of native butternut and to test for resistance to butternut canker. The Forest Service selections were made from butternut trees that survived around other butternut trees that died from canker, giving hope that this is a sign of resistance. Iowa has planted 150 of these seedlings in 2007 and 2008 (41 families) in two different areas in the Loess Hills State Forest and on one site in Yellow River State Forest.

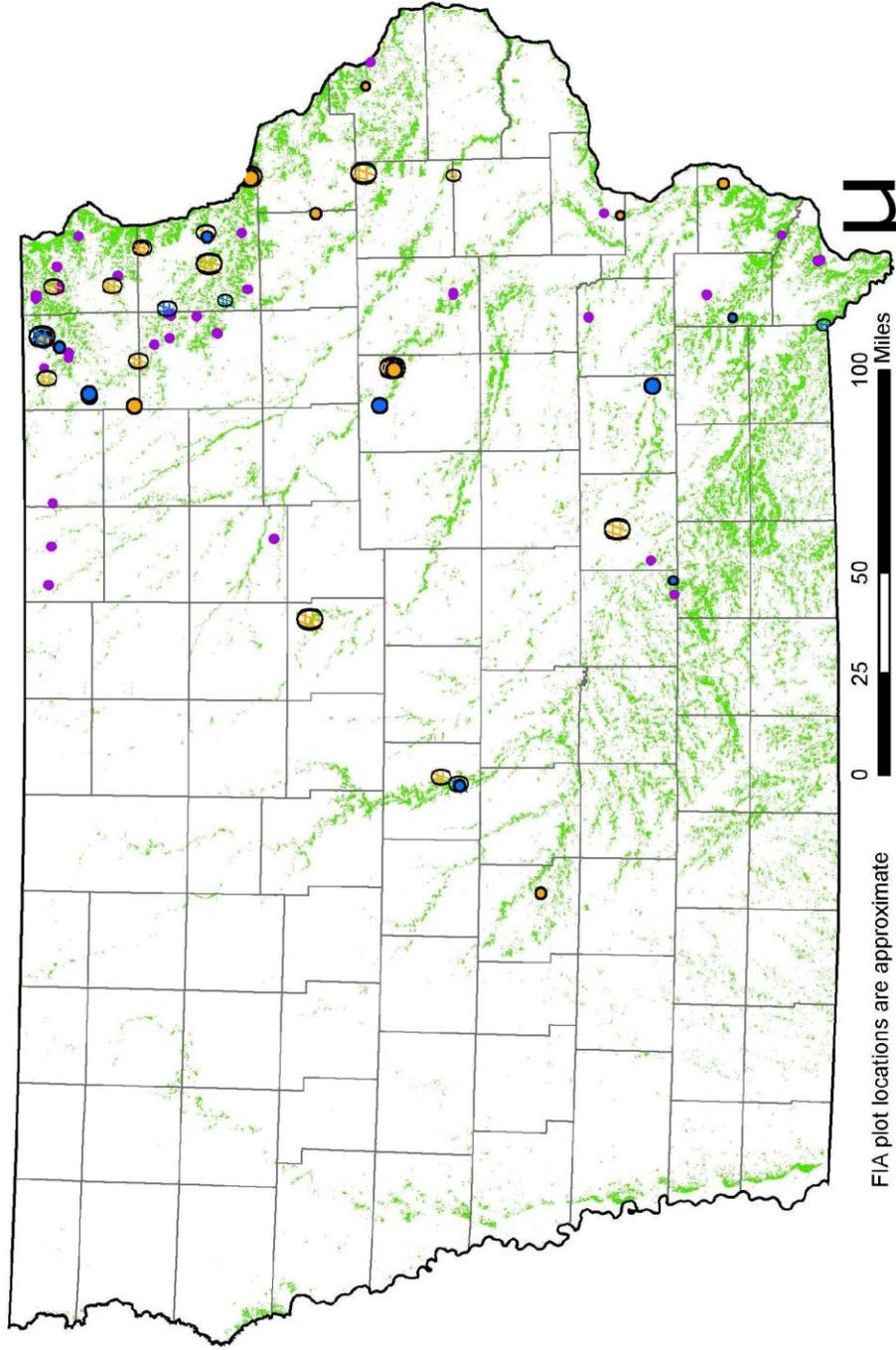
In 2009 Iowa along with 4 other states (IN, CT, VT, PA) put together a grant to fund more butternut survey and research. The grant helps to get more butternut surveyed in these states, record with GPS devices the locations of known butternuts, perform DNA testing to determine which trees are native, grafting scion from native selections, perform butternut canker resistance testing through direct inoculations and plant preserves/ orchards of more butternut trees that have the exact genetics of the forest grown survivor trees.

Iowa has planted an additional 350 seedlings grown from seed by Hardwood Tree Improvement Regeneration Center (HTIRC) in the spring of 2010 from trees growing throughout the northeastern U.S. in an effort to continue to preserve more butternut seedlings. It is easier to collect seed from a wide area and grow them in a nursery bed, rather than grafting exact genetics.

Finally, DNR foresters are continuously following-up on leads of known forest grown butternuts. We have collected seed from 20 different butternut trees and established an Iowa butternut orchard in the Loess Hills as well. We have used DNA testing to determine which trees are pure and which are hybrid, so far we know we have 12 pure native butternuts and 1 hybrid, with the other trees still needing to be tested. We have another 15 to 20 butternut trees to visit, collect scion and test for purity during the winter of 2010.

Contact Aron Flickinger at 515-233-2357 (aron.flickinger@dnr.iowa.gov) for more information or to report the presence of a living butternut tree.

Butternut trees in Iowa



FIA plot locations are approximate

FIA 1999-2008		FIA 1999-2008		FIA 1990		FIA 1990	
Live DBH (in.)	Dead DBH (in.)						
• < 7	⊗ < 7	• < 7	⊗ < 7	• < 7	⊗ < 7	• 7 - 12	⊗ 7 - 12
• 7 - 12	⊗ 7 - 12	• 7 - 12	⊗ 7 - 12	• 7 - 12	⊗ 7 - 12	• > 12	⊗ > 12
• > 12	⊗ > 12	• > 12	⊗ > 12	• > 12	⊗ > 12	• > 12	⊗ > 12

IA-DNR Historic Forest Stand Boundaries

Map produced by: Mark D. Nelson
 Forest Inventory and Analysis (FIA)
 USDA Forest Service, Northern Research Station
 St. Paul, MN
<http://www.nrs.fs.fed.us/fia/>
 Projection: UTM Zone 15N, NAD83
 Scale: 1:2,500,000