Butternut Canker and the USDA Forest Service Response

Paul Berrang, Milwaukee, WI
Mike Ostry, St. Paul, MN
Keith Woeste, West Lafayette, IN
Manfred Mielke, St. Paul, MN

Butternut canker is caused by the fungus *Sirococcus clavigignenti-juglandacearum* and is killing butternut (*Juglans cinerea*) throughout the range of the species. Surveys from about five years ago indicated that about 80 percent of the trees in parts of the northern range were infected. The situation has probably gotten worse since then. The USDA Forest Service is composed of separate parts that have different legally defined functions. Three parts of the agency play a role in helping to preserve butternut.

Forest Service Research (FSR) supports both basic and applied research on butternut canker. Mike Ostry and his coworkers in St. Paul, Minnesota, have shown the pathogen has very limited genetic diversity, suggesting that it is of exotic origin. They have refined techniques for inoculating butternut with the pathogen. These techniques have already been used to define the host range of the pathogen. These techniques could be used in the future to screen butternut for resistance to butternut canker. Ostry and his coworkers have shown that some trees remain disease free for up to ten years even when surrounded by severely infected trees. This indicates that some trees may be resistant to the disease. They have refined techniques for clonally propagating butternut. These techniques can be used to establish clone banks and breeding orchards. Keith Woeste and his coworkers at West Lafayette, Indiana, have shown that hybrids between Japanese walnut and butternut are not unusual, particularly near towns and farms. He has found that some of the most vigorous butternut are actually hybrids or species intermediates and that some nursery stock sold as butternut is actually a mix of butternut, hybrids and intermediates. He is developing a DNA test that could be used to distinguish between pure butternut and intermediates. Jim McKenna, who also works at West Lafayette, has searched for disease-free butternut over a multi-state area and propagated them into clone banks where they can be evaluated and re-propagated.

State and Private Forestry (S&PF) is involved with a variety of technology transfer, technology development and pest surveys that relate to butternut. S&PF was the first part of the USDA Forest Service to work on butternut canker. Bob Anderson and Leon Lamadeleine published the results of a survey for butternut canker in 1978, one year before the fungus that causes butternut canker was first described. Since then S&PF has issued a number of pest bulletins on butternut canker. Cindy Ash is cohosting a workshop on butternut canker in Niagra Falls, Ontario, in October 2006. More recently S&PF has funded a number of environmental monitoring and technology development projects that relate to butternut canker with university researchers. These projects have supported surveys for butternut canker in a number of states. One of these projects at the University of Tennessee has shown that there are differences in resistance to butternut canker among open-pollinated families. This shows that resistance to butternut canker is genetically determined and suggests that it would be possible to breed for resistance to this disease. Manfred Mielke of S&PF has cooperated with Mike Ostry of FSR to publish management guidelines for butternut.

The National Forest System is the land management branch of the USDA Forest Service. Its activities are focused on managing butternut on the National Forests. Butternut has been identified as a sensitive species on all of the Forests where it occurs. This means the species is given special consideration during land management activities and records are maintained of where butternut are found. Jan Schultz, formerly of the Hiawatha National Forest, worked with researchers and contractors to prepare a Conservation Assessment for butternut. This document summarized what was known about butternut, butternut canker and their management. Employees of the Chequamegon-Nicolet National Forest have cooperated with Mike Ostry of FSR to evaluate the effects of various silvicultural practices on butternut and butternut regeneration.

A number of National Forests have planted butternut in restoration projects. One problem with restoration projects is getting genetically diverse seed that is known to be pure butternut. Recently the Genetics Program within the National Forest System has started a program that will help preserve a portion of the butternut genome and make genetically appropriate seed available for restoration projects. This work applies techniques developed by researchers in an operational setting. It includes searching for relatively healthy butternut, collecting scion, grafting it onto walnut rootstock, and testing it to determine whether it is pure butternut. Material was collected from the Chequamegon-Nicolet National Forest in Wisconsin last winter and grafted this spring. We expect to plant it in a clone bank next spring. When this material starts to bear seed it will provide a seed source for restoration projects on the Forest. We expect to search for and collect additional material from nearby parts of Wisconsin this winter. We expect to expand this work to other National Forests in the Northeast in the future.