NC NEWS

NORTH CENTRAL FOREST EXPERIMENT STATION

October/November 1999

North Central Research Station Provides Millennium Tree for the U.S. Capitol

"Gift to the Nation" is a Gift From Research

Matthew Evans, the Landscape Architect for the Nation's Capitol, has an eye for trees. After a nationwide search, he found this year's National Capitol Holiday Tree—a beautifully hued, perfectly formed white spruce—at North Central's Forestry Sciences Laboratory in Rhinelander, Wisconsin. At more than 70 feet tall and 28 inches in diameter, the "Millennium Tree" is the tallest to ever grace the west lawn of the Capitol. It's also the first to come from the Research branch of the USDA Forest Service.

With care and a crane, Wisconsin's "Gift to the Nation" was loaded onto a special delivery truck on November 11, beginning a statewide whistlestop tour of 32 Wisconsin communities before heading to DC. The cutting ceremony attracted dignitaries, media, and Wisconsin school children to the Rhinelander lab. It was a chance for us to celebrate with our new partners, and tell the story of how this famous white spruce came to be. It's a story that epitomizes Forest Service Research.

▲ *Here it is! The 30th National Capitol Holiday Tree, a 63-year-old white spruce. This is the first Capitol tree to come from Forest Service Research.*

◀ *The 11,800 lb tree will tour Wisconsin in a 90-foot trailer, its trunk and limbs nourished by a bath of sugar water. Forest Service employees were the first to sign the giant "Holiday Card to the Nation."*

In the News

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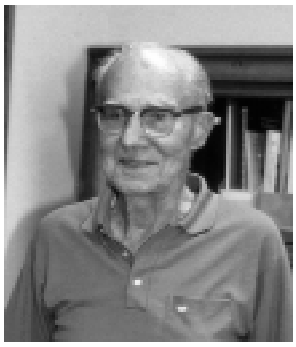
Rudolf Was a Researcher



Paul Rudolf

Paul Rudolf, a preeminent silviculturist during the early days of the North Central Research Station, also had an eye for trees. In 1936, Paul Rudolf began a search for the perfect white spruce, one that grew fast and straight, resisted frost, and had minimal branching. (He wasn't thinking about the Capitol, he was thinking about superior wood products.) In what is called a provenance trial, he traveled extensively, collected seeds from the very best trees he found, and then planted them in Rhinelander's Hugo Sauer Nursery.

Capitol Landscape Architect Matthew Evans searched the country for the perfect Millennium Tree.

When those seeds grew into seedlings, Rudolf planted them in five field locations around the Lake States. After years of growth measurements, NC's Forest Tree Improvement Committee determined that the best-suited provenance for this region was one that Rudolf had found in southeastern Ontario. (The results became NC's very first research paper, RP-NC-1!) Forest industry adopted the Committee's top choice, and this provenance became the basis for structural lumber products that come from the Lake States.

And yes, Virginia, we believe that one of Rudolf's trial seedlings was planted right outside the nursery, and it grew to be the Millennium Tree. According to NC scientists, it's only one of the many legacies that Rudolf left behind. "Rudolf's work set the foundation for the breeding and selection work that continued for decades here at the station," said Jud Isebrands, project leader of the Ecophysiological Processes unit. "The long line of researchers has included Hans Nienstaedt, Phil Larson, Bruce Haissig, Don Riemenschneider, and Charles Michler. We are his legacy, and it's a great example of how research is not a solo endeavor. The questions continue to be explored by teams of researchers, standing on the shoulders of giants like Rudolf."

Research Helped Wisconsin Forests "Rise From the Ashes"

According to Wisconsin's State Forester Gene Francisco, NC researchers were instrumental in helping Wisconsin forests "rise from the ashes" after the cut-and-burn period at the turn of the century. "By 1900, there were fewer than 1 million acres of forestland left in the State," Francisco said. "One hundred years later, we have 16 million acres, and a forest products industry that ranks second in the Nation. That's the result of science-based restoration and management. First, Forest Service genetics research helped us fill our nurseries with superior native species. We replanted, and then managed the growing forests according to the Station's silvicultural guidelines. To this day, NC's silviculture workshops at the Argonne Experimental Forest are required for every forester in Wisconsin's Department of Natural Resources."

Research also contributed to the growth of the Christmas tree industry in the Lake States. According to Virginia Mountford, Executive Secretary of the Wisconsin Christmas Tree Producers Association: "Research into frost-resistant balsam fir [Don Riemenschneider] gave growers a more reliable product. We also owe a debt to Tom Nicholl's and Darroll Skilling's Christmas tree pest management research. Insect and disease research continues to be vital to our economic survival." Wisconsin now ranks third among the Nation's Christmas tree producers, producing 3 million trees each year. Seventy of those trees will make their way to DC this year to adorn the Supreme Court, Library of Congress, the inside of the Capitol, and other public buildings.

Meanwhile, NC scientists at Rhinelander are still carrying the baton that Rudolf passed, anticipating the needs of the next generation of resource managers in the region (see Research Roundup, pages 3 and 4).

What Are They Studying Now? Rhinelander Research Roundup

NC's Forestry Sciences Laboratory in Rhinelander, Wisconsin, boasts a cadre of world-class researchers investigating local and global natural resource issues. Here's a guided tour of the research currently underway:

Global Climate Change

Jud Isebrands' team, in partnership with Michigan Technological University, has created an 80-acre window into the "what if?" of global climate change. At the world's largest free-air carbon dioxide enrichment (FACE) facility, they are fumigating a growing hardwood forest with year-2050 levels of two greenhouse gases—ozone and carbon dioxide. Over the next 10-30 years, they will look at the effects of these pollutants on all aspects of the tree, "from shoot tip to root tip," with an emphasis on factors that affect tree growth, such as crown morphology, physiology, and carbon-nitrogen interactions. Beyond individual trees, team members will study effects on the whole ecosystem, from aboveground changes in insect populations to belowground changes in microbial ecology. Rhinelander is the only FACE facility in the world looking at the interaction of both gases in an outdoor setting, with field-grown seedlings in a northern hardwoods mix. For more information, contact: Jud Isebrands, jisebrands/nc,rh@fs.fed.us, 715-362-1116.

Short-Rotation Intensive Culture

Don Riemenschneider and colleagues are improving the short-rotation intensive culture of fast-growing hybrid poplars, a system that is five- to ten-times more productive than traditional forestry. To help fine-tune the system, researchers are applying quantitative genetic theory and gene mapping technologies to optimize breeding and selection of new species, while continuing to test various methods of weed control. They're also developing a new system that can help stabilize riparian areas. The potential is great: One 50,000-acre plantation of hybrid poplars could produce as much fiber as one of our Lake States national forests. But they're more than a fiber source; intensively grown poplars are also a climate-neutral fuel source (living trees absorb CO_2), an alternative cash crop for farmers, and an erosion-fighting way to reforest riparian areas. For more information, contact: Don Riemenschneider, driemenschneider/nc,rh@fs.fed.us, 715-362-1115.

Forest Insect Research

Bill Mattson and colleagues are investigating the effects of biotic and abiotic stresses on tree-insect-natural enemy interactions. Their goal is to clarify the mechanisms behind tree resistance to insects, while developing safe, effective, and economical management strategies for native and exotic forest insects. Some of Mattson's recent accomplishments include compiling the first complete list of more than 400 exotic insects that feed on woody plants in North America, coauthoring an insightful book chapter on tree-feeding sawflies, editing a major scientific review of insect-tree chemical interactions, and developing "the crucible theory," which explains why European exotics do so much better on our continent than our insects do in Europe. For more information, contact: Bill Mattson, bmattson/nc,rh@fs.fed.us, 517-355-7740.

Landscape Ecology

Eric Gustafson is finding innovative ways to model and eventually predict the ecological consequences of landscape change at multiple scales (from within-the-watershed to across-the-landscape). His software simulates changes in landscape structure, composition, suitability to wildlife, etc., as a result of various land uses, resource management techniques, and natural disturbances. The final product is a sequence of before-and-after-the-disturbance maps. These tools will help resource managers and planners: (1) take stock of what's currently happening on the landscape, (2) "test drive" different management approaches *in silico*, and (3) choose the best option from a suite of alternatives. For more information, contact: Eric Gustafson, egustafson/nc,rh@fs.fed.us, 715-362-1152.

Northern Forest Silviculture

Terry Strong is building on the legacy of silvicultural research for which North Central is renowned. Starting with the infinite variety of silvicultural options available to managers, Strong helps pare down the options, demonstrating combinations of logging methods, regeneration systems, soil management methods, thinning regimes, etc., which will sustain ecosystem health while meeting manager and landowner needs. He is involved in the reassessment of long-term studies, and the establishment of new ones that will be taken up by future researchers. Some of his most recent work involves gap studies in northern hardwood forests—finding the optimum density of "leave" trees and size of openings to enhance tree diversity after harvest. For more information, contact: Terry Strong, tstrong/nc,rh@fs.fed.us, 715-362-1124.

Forest Biotechnology

Paul Zambino and colleagues are examining trees that have a natural tolerance to stress, then trying to identify the genetic and molecular bases for these traits. Finding out why some eastern white pines are resistant to white pine blister rust, for instance, may help us bring this signature tree back to the Lake States. Zambino is now developing rust screening methods that reliably predict rust resistance in very young trees. He is also determining genetic variation in rust strains so we know what kind of resistance mechanism trees will need to combat the most prevalent strains. Paul Anderson and Paula Marquardt are using DNA fingerprinting techniques to understand how genetic diversity in eastern white pine varies across the landscape, and how forest management might affect these patterns. Other research seeks to understand the mechanisms that allow some northern red oaks to tolerate the stress of changes in atmospheric gases. For more information, contact: Paul Zambino, pzambino/nc,rh@fs.fed.us, 715-362-1178.

NC Helps Wisconsin Celebrate - The Grand Tour

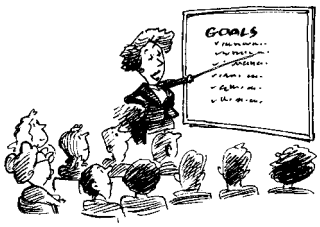
Think of the Olympic torch run, but instead of the flame, imagine a 70-foot tree winding its way through the Wisconsin countryside. That's what the next few weeks will hold for the Millennium Tree. Wisconsin people are justifiably proud that the Millennium Tree hails from their State, and they're celebrating in high style. NC's been happy to help with the following:

Community celebrations: The Millennium Tree is coming to 32 towns, and many have planned parades and celebrations for the visit. At every tour stop, folks from North Central and Wisconsin's Bureau of Forestry will tell the story of the tree, gather toys for Toys for Tots, and thank local growers for their gift of smaller trees. Although the giant tree will be under wraps, residents can view a 4-foot-high picture of the tree along with an artist's print painted on the sides of the truck. In the open spaces, residents can write their Season's Greetings, sending a giant mobile holiday card from the people of Wisconsin to the Nation.

Handmade decorations: A 70-foot tree has a lot of real estate to decorate! Children and adults from throughout the State crafted more than 5,000 large ornaments, all from natural materials. These "special forest products" will help showcase Wisconsin's natural resources, which are as valuable and diverse as the crafters themselves.

Essay contest: Thousands of fourth graders around the State participated in an essay contest, answering the question "If you were the Millennium Tree standing proud and tall before our Nation's Capitol, what would you tell America about Wisconsin's forests?" Each school selected a winner and submitted the entry to a panel of judges from the Society of American Foresters. The winning students and their parents will receive an all-expense-paid trip to Washington, DC, for the tree lighting ceremony. Other Wisconsin students will follow the tree's route around the State and on its journey to Washington, DC, via the Millennium Tree Route Map.

Fourth-grade curriculum: As part of the Millennium Tree project, every fourth-grade classroom in Wisconsin was sent a conservation education curriculum on sustainable forestry, developed by the Wisconsin Department of Public Instruction and the Wisconsin Bureau of Forestry in cooperation with the Forest Service's North Central Research Station and Northeastern Area, State and Private Forestry. The 200-page curriculum, designed to meet all State Educational Standards, is a model for future natural resources teaching aids.



Making ornaments for the Millennium Tree is fun for all ages. Top: Kids at the Wisconsin State Fair are displaying their artistry. Below are just a few of the 5,000+ ornaments made by Wisconsin residents.

Special Delivery By Train

Wisconsin residents will have the opportunity to see their tree off at a November 27 press conference and reception hosted by Governor Tommy Thompson and First Lady Sue Ann Thompson at the Milwaukee Amtrak station. Citizens can sign their last wishes for the millennium on the side of the truck before it is loaded onto a train bound for Washington, DC. This marks the first time a Capitol holiday tree will be transported by train.

Upon arrival in Washington on November 29, the Millennium Tree will have traveled a total of 3,000 miles since it was cut. The Governor and Mrs. Thompson, along with Forest Service Chief Mike Dombeck and other dignitaries, will present the tree to the Wisconsin delegation at a press conference at Union Station before it's transported the last mile to the U.S. Capitol. When the tree arrives, landscape crews will gently move the "People's Tree" from the special Mack truck to the west front lawn of the U.S. Capitol, facing the Washington monument. For several days, crews will adorn the tree with 10,000 lights and 5,000 handmade ornaments.

On December 9, U.S. Speaker of the House, Dennis Hastert, will light the tree in a special ceremony along with Governor and Mrs. Thompson, Forest Service Chief Mike Dombeck, USDA Secretary Dan Glickman, Wisconsin delegation, and essay contest winners.

As the Millennium Tree radiates with light and good wishes, its natural beauty will send a message to citizens nationwide about the role research plays in sustaining Wisconsin's forest resources. NC's employees, from Paul Rudolf to today's youngest scientist, are proud to help those forests remain "forever and for everyone." For more information about the Millennium Tree or its accompanying events, readers can log-on to the Millennium Tree website at www.millenniumtree.org, or contact Tim Swedberg at 651-649-5257.

Future view of the lighted Millennium Tree in front of the U.S. Capitol, Washington, DC.

North Central Research Station salutes the dozens of individuals, organizations, agencies, and companies that contributed to this stellar effort.

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