

# The Outside Story



## Beech Bark Disease

By: Joe Rankin

If you've ever seen chevrons on the bark of an American beech, you know you're looking at a tree that's been hugged by a black bear. And you've likely been impressed with the bear's climbing ability. And perhaps looked over your shoulder while you were busy being impressed.

But bear-clawed beeches aren't as common as they once were. The American beech, *Fagus grandiflora*, has become another member of the North American "trees-devastated-by-imported-pests-and-diseases" club.

Beech trees are still out there in the forest. But many of the big ones are gone, victims of the notorious beech bark disease. It's a one-two punch — a tiny scale insect bores holes in the bark and a fungus marches in and infects the tree.

These days, beeches in northern New England are all too likely to be small and stunted or to bear the ugly, puckered cankers that mark them as infected.

Beech bark disease "causes significant mortality and defects in American beech," write US Forest Service researchers David R. Houston and James T. O'Brien. It's a disease that has changed the role of the tree in the forest and undoubtedly had a trickle-down effect on animals that relied on the tree's nutritious nuts for food.

The malady was already killing beech across Europe in the mid-1800s. By 1890 it had arrived in Nova Scotia and by the 1930s was killing beeches in Maine.

At first the tiny non-native scale insect, *Cryptococcus fagisuga*, was seen as the direct cause of death. In 1914 scientists figured out that one of two European fungus species — now called *Neonectria ditissima* and *Neonectria faginata*— invaded through the wounds made by the insect and spread beneath the bark, weakening and eventually killing the tree.

Mark Twery, who researched beech bark disease in graduate school and later during a career at the US Forest Service's Northern Research Station, characterizes it as an opportunistic relationship. The scale insect's damage makes the beech more susceptible to the fungus. Later, rough patches on the bark created by the fungus, gives the scale insect more crevices to settle into. Twery calls it a "positive feedback" loop. It is a complicated disease, and that complexity has made it difficult to combat.

Over a hundred years after it arrived, beech bark disease is still spreading across the continent, said Twery. It has made it as far as Michigan, is headed deep into the South, and pushing north into Quebec, apparently destined to penetrate to every corner of the American beech's range.

It is interesting that the disease has taken more than a century to get as far as it has. It's been slowed not by geography, but climate, said Twery. The scale insect is mainly spread by wind, and the prevailing winds in North America are west to east. But, of course, sometimes they blow the other way. Think nor'easter. Birds have undoubtedly carried the insect on feet and feathers. These days, said Twery, the main long-distance vector is people moving firewood.

Twery said his initial research in forests in Massachusetts and New Hampshire showed that when the disease swept through it killed off many of the bigger specimens.

But...“some beech trees are totally resistant to the insect and they don't get the fungus. Some are resistant to a certain extent. Some are tolerant, but to different degrees. Some trees can wall out the fungus, so the necroses don't actually reach the cambium and the tree stays much healthier,” he said.

Twery said he finds it fascinating that the tree's response to the “stress and insults from this combination disease” isn't just to give up and die. “Instead of disappearing from the forest,” he said, the declining trees send up root suckers that grow into small trees that are then disfigured by the disease. “The beech keeps growing. It gives you a lot of respect for the tree.”

Of course, a thicket of stricken saplings or even bigger diseased trees isn't going to make the same contribution to the forest ecology as a big healthy beech. The disease “certainly reduced the amount of mast in the northern hardwood forest ... which has made it harder for animals that depend on hard mast,” said Twery. Bear, deer, and now, wild turkeys among them. People don't tend to look as kindly on the species either.

There are organisms that prey on both the scale insect and the fungi, but biocontrols probably aren't the answer. The scale insect is a tough customer, notes Twery. It's parthenogenetic, so it doesn't need to mate and spends most of its life beneath the bark. And chemical sprays aren't practicable in a forest.

Modern genetics may help. Researchers have been working to isolate the genes that make trees resistant to the disease. This past summer a team identified “a single locus of major effect contributing to beech bark disease resistance” which they reported “might be used in applied breeding, conservation and restoration programs.”

Twery notes that even “if you took people out of the mix and waited hundreds or thousands of years, those few beech that are resistant would likely eventually succeed and replace those susceptible to the disease.” That's good news for the trees, though not much solace for this year's hungry bears.

*Joe Rankin lives in Maine. He writes on forestry and nature. The illustration for this column was drawn by Adelaide Tyrol. The Outside Story is assigned and edited by Northern Woodlands magazine, [www.northernwoodlands.org](http://www.northernwoodlands.org), and sponsored by the Wellborn Ecology Fund of New Hampshire Charitable Foundation: [wellborn@nhcf.org](mailto:wellborn@nhcf.org).*

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Woodlands**

PO Box 471, Corinth, Vermont 05039  
Tel. 802.439.6292 Fax 802.439.6296  
[www.northernwoodlands.org](http://www.northernwoodlands.org)

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