New Hope for Chestnuts

By Marie Woodward, UConn Home & Garden Education Center

While renovating our bathroom, we discovered a treasure, a relic of an icon long gone from our U.S. forests. Under the drywall, we found amazingly wide paneling from a mature American chestnut tree and it was *beautiful*. Our excitement at finding something so rare and lovely was mixed with sadness that these magnificent giants are no longer part of our Connecticut landscape.

American chestnut tree, *Castanea dentata*, was once the largest and most abundant tree in the eastern half of the United States - four billion in number. Wildlife depended on it for survival. It produced a dependable supply of highly nutritious nuts every year. Humans relied on these nuts too, to feed their livestock and their families. The wood from American chestnut trees was long, straight, and rot resistant, so it was used to build the houses and barns and fences needed by American settlers.

But in 1904, a fungus, *Cryphonectria parasitica*, better known as chestnut blight, entered the U.S. from imported Asian chestnut trees. Though Asian chestnut trees were highly resistant to the blight, the American chestnut had no resistance. The result was an ecological disaster. Within half a century almost all of the country's American chestnut trees died, with near catastrophic consequences for both wildlife and the humans who depended on them.

Chestnut blight canker.
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Today, the American chestnut is considered functionally extinct. That's because while American chestnut trees still emerge from long dead underground chestnut root systems, the blight kills them before they mature. However, thanks to science and a network of volunteers, all is not lost.

Currently there are two main programs targeted at successfully developing a blight-resistant American Chestnut tree. The American Chestnut Foundation is heading up a a multi-generational effort to cross-breed vulnerable early-growth American chestnut trees with blight-resistant Chinese chestnut trees in order to produce an American/Chinese chestnut hybrid with blight resistance. Then, by back-breeding the resulting Asian-American chestnut hybrid with other American chestnuts, scientists hope to remove most of the Chinese chestnut characteristics, (all but the blight resistance) producing a tree that will be 1/16 Chinese chestnut and 15/16 American chestnut, and look and grow almost exactly like the purebred tree.

A second approach is underway at SUNY'S College of Environmental Science and Forestry. It involves working to save the American chestnut through gene replacement therapy, a process called transgenics.

Researchers discovered a gene in wheat that detoxifies the acid the chestnut blight fungus uses to attack American chestnut trees. Employing transgenics, bio-geneticists have introduced the acid-fighting gene into the American chestnut, with very hopeful results. The new gene has enabled many of the new hybrid trees to neutralize the blight's acid without taking on any characteristics of the Asian chestnut tree. The result appears to be a virtually identical American chestnut tree that can fight off the blight. Scientists hope to cross breed it with surviving American chestnut sprouts in the wild that have not yet been attacked, and older trees that have so far survived the blight.

They hope to fully implement this plan through three approaches: 1) using the new transgenic tree to reforest land previously deforested by mining, 2) planting the transgenic chestnut trees at historic sites associated with the American chestnut to recover the landscape's true historic appearance; 3) encouraging the public to plant trees on their own lands. To join this effort, contact the Connecticut chapter of the American Chestnut Foundation. www.ctacf.org .

If you have questions on gardening topics, feel free to contact us, toll-free, at the UConn Home & Garden Education Center at (877) 486-6271, visit our website at www.ladybug.uconn.edu or contact your local Cooperative Extension center.