



## **Pride of the Forest, Restored**

Have you ever planted a tree to commemorate a milestone in your life? Even those who don't think of themselves as gardeners plant trees to mark the birth of a child, an anniversary, or the loss of someone dear. I think that when we plant a tree and watch it grow through the seasons, we're reminded that we are doing the same. Our connectedness adds luster to the happy moments, and comforts us in darker days.

My neighbor Gerry Matthews recently planted a tree in memory of his much-loved late brother Dennis. Dennis was smart and funny, sturdy and handsome, so not just any tree would do. In his memory, Gerry planted an American chestnut.

Do you know the story of the American chestnut? Not so long ago—before 1900—they were the dominant species of North American forests. Tall, straight, fast-growing and rot-resistant, with white flowers in the spring and branch-bending loads of sweet nuts in the fall, they were the perfect tree, meeting so many needs of humans and wildlife alike. In fact, they were nicknamed the “cradle-to-grave” tree. It's estimated that there were forty billion chestnut trees across North America. But by 1940, with the exception of a few isolated stands, they were gone.

What happened? Human intervention, of course; unintentional, but no less lethal. People imported Japanese and Chinese chestnuts, which were viewed as more ornamental than our natives. Unknown to importers, a hitch-hiker was introduced: *Cryphonectria parasitica*, commonly known as chestnut blight, a fungus to which the foreign species had natural resistance, but our native trees had none. (The fungus infects oaks, red maples, staghorn sumac, and shagbark hickories too, but they're better able to fight it off.) It girdles the trees, destroying their ability to move nutrients and water above the infection line, killing everything above the roots. The tree may not be dead, and can resprout from the roots, but the new growth will only survive a few years before it, too, is killed.

The catastrophic loss of the American chestnut has been called the world's greatest forest ecological disaster (by comparison, it's estimated that Dutch Elm Disease killed 'only' 40 million American elms), and with good reason. The consequences would have been felt most immediately by the birds and small mammals who sheltered in the trees and ate the nuts, and then by the larger animals who preyed on them, and the smaller animals and insects they no longer kept in check. When sunlight penetrated once-shaded forests, the species that made up the understory changed, to the benefit of some creatures but

detriment, even to the point of extinction, of others. All the way up the chains of both plant and animal life, the balance shifted.

Humans didn't escape the impact, either. Chestnut trees were a favorite for log cabins (when you build a house using logs for the foundation, you need rot resistance) and they were just as valuable for general construction and furniture making, but the largest segment of the lumber industry was gone. The nuts, smaller and sweeter than other varieties, were a favorite of wild turkeys, foraging pigs, and people, but those in poorer rural communities could no longer send their animals out into the woods to fatten up, or supplement their incomes by sending chestnuts to be roasted by street vendors for sale to city folk. In some areas, notably in Appalachia, the death of the trees killed entire communities.

Is the chestnut lost for good? The American Chestnut Foundation, [www.acf.org](http://www.acf.org), together with dedicated scientists, is waging an all-out campaign to repopulate American forests with a tree having all the attributes of the original, but also blight resistant. Traditional strategies include a search for a fungicide that can kill the blight fungus without harming other, more beneficial organisms, and hypovirulence, which intentionally infects trees with a virus capable of killing or weakening the fungus. Hybridizers have crossed and backcrossed four generations of surviving trees, and now have seedlings that are 15/16ths American chestnut with, it is hoped, the remaining 1/16<sup>th</sup> containing the coveted Chinese chestnut genetic material that conveys disease resistance.

The fourth, newest, most exciting approach involves transgenics—identifying useful genetic material from another plant and splicing it into the chestnut genome. The first splice, using a wheat gene that generates an enzyme that improves disease tolerance, was very promising, and researchers are continuing to identify helpful genes from other species, including the Chinese chestnut itself. If researchers can establish a reasonable certainty that the alteration doesn't have any unwanted side effects on plants, insects, or the environment in general, trees with meaningful blight resistance may be available in just a few years. Some of us may live long enough to sit in the shade of these handsome, fast-growing trees.

In our human ignorance we have taken so many plants and animals out of their perfectly balanced ecosystems, creating this and so many other environmental catastrophes. The possibility that human intelligence, scientific advances and dogged persistence can revitalize a magnificent American native tree gives us hope that answers to other, seemingly insurmountable environmental problems are not too far behind.

Dennis's tree, a pure, non-hybridized American chestnut, isn't disease resistant, and may succumb to the blight someday. But it just might live long enough to produce flowers which, crossed with pollen from a modified tree, will produce a seedling that will survive and thrive. And his children and grandchildren will admire that tree, and remember him.