# Death and Rebirth of a Mighty Giant, the American Chestnut

Doug McLane

An old saying goes, before the chestnut blight decimated the North American chestnut tree population, that "A squirrel could travel from Maine to Georgia on chestnut tree branches without ever having to touch the ground." Chestnut trees once numbered in the many billions and made up an estimated one-third of the hardwood trees east of the Mississippi River. The tree was cherished for many reasons. Its nuts were the biggest producer of mast (nuts) which fed wild turkeys, bear, deer, and Native Americans. Its wood was rot-resistant thus making excellent fence posts and framing for houses and barns.

When the blight (a fungal disease) was accidentally imported from Asia in the very early 1900s, it caused the biggest ecological disaster to hit North America in recorded history. By the 1950s, American chestnut trees were 'functionally extinct' from the eastern forest ecosystem. While there were, and continue to be, a few straggler chestnut trees, they no longer are significant in our forests. Oddly, the blight kills the above-ground portion of the tree, but not its root system. Thus, century-old stumps can continue to sprout, but because the blight kills the sprout before flowering age, the American chestnut could be doomed to extinction.

The American Chestnut Foundation which has been working for over 40 years to breed a genetically resistant strain of chestnut trees. I was a bit haunted by the knowledge that I had seen a healthy survivor years ago, but couldn't remember its exact location. The big old chestnut tree I remembered had been mistakenly cut down in a logging operation years ago. To make a sad story bright, some of the saplings from that had been planted in a vacant field off Buffalo Road. Of course, I was skeptical that we would find a non-blighted survivor these 35 or so years later. But, to our amazement, alongside the edge of the field were two magnificent chestnut trees. They were healthy and one was covered with thousands of chestnut burrs! The larger tree was about 16 inches in diameter, and the other about ten. The larger is likely the largest healthy chestnut tree in NH. An American chestnut will only flower and fruit if exposed to full sunlight. Although the smaller shaded tree was healthy, it produced no flowers to cross pollinate its field mate. We found several saplings in the area, so the 'mother' tree was either demonstrating that there are occasional cross pollinations or there was another nearby chestnut that did flower.

In the early 1980s, original volunteers within The American Chestnut Foundation decided to try the 'backcross' technique on chestnuts. It had worked well on cereal grasses and other domestic crops. Essentially, backcrossing is a technique where a species is crossed with a close relative that has a desired trait, and then all but the desired trait is 'bred out' by 'backcrossing' the hybrid offspring to the original parent line. Unlike grains, which mature in months, trees take years to flower and bear fruit – in the case of chestnuts, at

least 5 years. Headquartered in Virginia, and aided by 16 state chapters, the American Chestnut Foundation volunteers crossed a blight-resistant Asian chestnut and 'backcrossed' at least six generations of trees to produce a variety that is 15/16th pure American, yet hopefully still carries the Asian genes of resistance. This variety is called the 'Restoration 1.0' chestnut and is slowly being made available for demonstration plantings. The Vermont/New Hampshire chapter of the American Chestnut Foundation recently did such a planting at the NH Audubon Society in Concord. In the future the hope is to plant millions of trees back into the chestnut ancestral range and let squirrels and birds take over from there, thus repopulating the Mighty Giant to its homeland.

The story does not end there. The next step in the recovery plan is to try to genetically customize the 'Restoration 1.0' variety for different regions. The reasoning being that a NH chestnut is likely to have adaptive genes different from a Virginia chestnut and different from Georgia chestnut, and so on. Each state chapter is crossing the Restoration-1.0 tree to wild survivors found in their particular state.

In a quirk of fate, the large healthy chestnut tree on Buffalo Road was discovered just as the VT/NH Chapter was searching for 'mother' trees to use in this next step. In 2014 and 2015, the NH Electric Co-Op kindly donated their bucket lift several times each season to facilitate this work. When the mother tree flowers in June, the bucket lift is used to remove the male flowers from about 60 selected flower clusters. The remaining female flowers are enclosed tightly in small paper bags to prevent accidental pollination. In about two weeks, when the enclosed female flowers are mature, the bucket lift is again used to artificially pollinate the female flowers with pollen from the Virginia Restoration-1.0 'father' trees, and the bags are replaced. Finally, in September, the bags are removed, and with luck, the burrs will have viable nuts carrying genes from the resistant 'father' and the native 'mother' tree. This summer, the nuts from last year's harvest, which have been held over winter in cold storage, will be planted at breeding orchards in Vermont and NH. It is my hope that sometime in the near future, we may be able to bring a 'new and improved' Rumney chestnut back to its original birthplace, perhaps starting with a demonstration planting near Quincy Bog.

Further information on American Chestnuts and membership in The American Chestnut Foundation may be found at www.acf.org.

Doug McLane is a former director of Quincy Bog Natural Area. He resides in Plymouth and has several chestnut saplings growing in his garden.